Rhodora

JOURNAL OF THE

NEW ENGLAND BOTANICAL CLUB

Conducted and published for the Club, by

MERRITT LYNDON FERNALD, Editor-in-Chief

JAMES FRANKLIN COLLINS
CHARLES ALFRED WEATHERBY
LUDLOW GRISCOM
CARROLL WILLIAM DODGE
} Associate Editors

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The New England Botanical Club, Inc.

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Vol. 31. January, 1929. No. 361.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 31. January, 1929. No. 361.

EDITORIAL ANNOUNCEMENT

After thirty years of devoted and gratuitous service the original editorial board of Rhodora has asked to be relieved of the responsibility of carrying on the journal; and a new board, containing only one of the original editors, has been appointed by the Council of the New England Botanical Club. With this change in the management of the journal it is appropriate to summarize very briefly the accomplishments of thirty years.

The cover of Volume 1, no. 1, issued January 2, 1899, enumerated the board: Benjamin Lincoln Robinson, Editor-in-Chief; Frank Shipley Collins, Merritt Lyndon Fernald and Hollis Webster, Associate Editors; William Penn Rich and Edward Lothrop Rand, Publication Committee. The cover of Volume 30, no. 360 (December, 1928) contains four of these names, the original board having lost by death Collins in 1920 and Rand in 1924. Collins's place on the board was filled in June, 1920 by the selection of Lincoln Ware Riddle, whose promising career was cut short in January, 1921; and in 1923 Carroll William Dodge took the place on the board left vacant after Riddle's death. The position of Rand was not filled. Thus, in its first thirty years Rhodora has been conducted by essentially the same board of editors; and, although to those who have followed the journal from the start the devotion of the original board has been repeatedly apparent, the new board of editors cannot take up its duties without realizing the difficulties it will encounter in emulating the constant attention to technique and proper presentation which have characterized the time-consuming and too often thankless editorial work of Dr. Robinson and the tedious and uncomplaining labor behind the scenes of Mr. Rich in personally sending out to subscribers all the copies of 360 numbers of the journal.

Those who knew the earlier days of RHODORA will also remember the great debt of the board to Collins, Webster and Rand, faithful attendants at all editorial meetings, judicious critics and advisers in editorial details and ready contributors to the pages of the journal.

The first thirty volumes contain 6698 pages of botanical matter, averaging 256 pages per volume; the smallest, of 207 pages, Vol. 22, immediately followed by the largest, Vol. 23 with 318 pages. The following statistics covering these volumes clearly show certain trends.

Volume	Pages	Articles	Contributors (old and new)	New Contributors each year	Plates[1]	New Botanical Names
1 (1899)	246	116	59	(59)	11	30
2 (1900)	260	114	60	17	11	33
3 (1901)	315	103	59	31	13	57
4 (1902)	268	126	68	29	6	32
5 (1903)	308	88	40	17	10	71
6 (1904)	254	89	51	12	11	35
7 (1905)	286	71	38	14	5	84
8 (1906)	246	74	33	8	8	138
9 (1907)	252	62	41	13	4	59
10 (1908)	234	74	49	14	2	210
11 (1909)	254	77	39	9	5	33
12 (1910)	245	65	31	5	2	41
13 (1911)	269	85	44	12	10	32
14 (1912)	254	84	46	11	6	31
15 (1913)	240	82	46	9	6	59
16 (1914)	225	74	35	8	6	67
17 (1915)	252	66	36	9	3	87
18 (1916)	269	61	35	9	8	146
19 (1917)	288	71	36	11	4	106
20 (1918)	220	64	29	7	3	86
21 (1919)	234	65	30	7	2	113
22 (1920)	207	57	28	8	2	51
23 (1921)	318	46	33	8	7	101
24 (1922)	259	45	31	4	5	73
25 (1923)	236	57	29	8	2	73
26 (1924)	249	61	36	8	9	62
27 (1925)	224	52	23	8	5	104
28 (1926)	260	46	30	8	3	63
29 (1927)	268	53	36	10	3	21
30 (1928)	258	60	39	17	19	90
Total	6698	2188	1190	399	191	2188
Range	207–318	45–126	23–68	4–31	2–19	21–210
Average	256	73	40	12	6	73

From this summary it is at once apparent that during its first four years RHODORA published, on the average, 115 articles by 61 or 62 contributors in each volume; but that after the fourth year the number

[1] Including unnumbered portraits.

both of articles and of contributors quickly fell to an average for the next twelve years of 77 articles by 41 contributors per volume, and again in the remaining fourteen years to an average of 57 articles by 32 contributors. This decrease is, of course, due largely to two factors: first, the early publication of a great number of brief notes from amateur collectors and observers who, at the end of four years, had seriously depleted their list of noteworthy items; second, the gradual increase of longer monographic papers and extended studies now often continued through two or more numbers. Thus, in the fourth volume (with the maximum number of articles as well as of contributors) there were ninety-five notes or brief articles, from a single paragraph to two pages in length, and only two articles of ten or more pages; but twenty years later, Volume 24 (with the minimum number of articles) had only eighteen papers under two pages in length but nine long articles, of ten to thirty pages each.

It will be noticed that practically 400 (399) different botanists have contributed articles to RHODORA. In addition 45 of these authors have also contributed plates; but besides these authors whose names have appeared on the title-page, thirteen artists, draughtsmen and photographers have furnished plates, mostly without charge and often in large number. Such authors of plates, added to those who have supplied the text, give us 412 individuals who have furnished the scientific matter in the first thirty volumes. These generous contributors of plates, whose names have not appeared either on title-pages or in indices, are: Blanche Ames, R. C. Collins, Anna Q. Churchill, C. E. Faxon, G. B. Fessenden, W. R. Fisher, Edna L. Hyatt, A. M. Johnson, E. H. Lincoln, F. S. Mathews, L. H. Merrill, R. E. Torrey, Una F. Weatherby.

From the editorial viewpoint there is special satisfaction in having a group of collaborators who can be relied upon to submit articles at frequent intervals, and it is gratifying to note that the retiring board was able so to rely upon a substantial group of authors. Outside the editorial board, whose pens or erasers were evident in all volumes, 20 botanists contributed to at least one-third (10) of the volumes, 1 of them (Evans) to 20, 1 (Deane) to 22, and 1 (Knowlton) to 27. Such loyalty deserves special acknowledgment and these most faithful supporters of RHODORA should at least be here enumerated: H. H. Bartlett, C. H. Bissell, S. F. Blake, Ezra Brainerd, E. B. Chamberlain, J. F. Collins, Walter Deane, E. H. Eames, A. W.

Evans, Emily F. Fletcher, Nellie F. Flynn, E. B. Harger, C. H. Knowlton, Bayard Long, F. Schuyler Mathews, A. S. Pease, C. S. Sargent, C. A. Weatherby, K. M. Wiegand, R. W. Woodward. Only limit of space prevents the enumeration of others who contributed extensively to a smaller number of volumes.

Fifty-six years ago, William H. Leggett, the founder of the pioneer *Bulletin of the Torrey Botanical Club*, in directing attention to the then young fields of plant anatomy and plant physiology, said: "Many causes have led botanists in America to give their attention more particularly to the systematic part of the science; but this field has been so well worked, and is so full of workers, that there is little room for any new comer to add much to our knowledge in this department." Leggett was giving voice to an impression which soon became a common one in America, especially among those whose enthusiasm was fired by the lure of microscopic technique and laboratory experiments but who soon forgot the need of knowing the exact identities and the phylogenetic, ecological and geographic relations of the plants with which they dealt. It is now clear, however, that there have been abundant opportunities for all new comers and that the fields of systematic and geographic botany, even in the areas naturally centering about New York and Boston, are far from exhausted. This statement has been vividly demonstrated by the publication in the thirty volumes of RHODORA of nearly 2200 novelties, chiefly from northeastern America; and by the notable fact that, although the pages of RHODORA have been freely open to every field of botany, all but a dozen at most of the 400 authors submitting papers for publication have been students of the systematic and geographic fields or of the natural history of plants. The real demand for a journal such as RHODORA is further attested by two striking facts: first, that, although the full issues of 600 copies were printed and additional issues of 500 reprints each were sent out, the demand in Europe as well as America for several papers of broad systematic, phytogeographic or geological interest has been such that the surpluses are exhausted and it may prove desirable again to issue reprints; second, that, far from being a journal of local New England interest and influence, RHODORA is regularly consulted in the libraries and herbaria of 33 Old World botanists, botanical institutions or universities, and in Dr. Eric Hultén's great work on the flora of Kamtchatka (certainly as remote from New England as any region

of the northern hemisphere), now being issued from Stockholm, references to papers published in RHODORA are surprisingly numerous. The period of general indifference to systematic and geographic botany is, then, rapidly passing and these subjects are again being recognized as fundamental to intelligent pursuit of the other branches of botany; and it has been repeatedly demonstrated of late that these old and neglected fields are full of unexplored paths and have many contacts with other fields long supposed to be separated from them by impassible barriers. Consequently, instead of being "well worked" with little opportunity "to add much to our knowledge," they are proving to be almost unexplored and peculiarly fruitful sources of discoveries and of far-reaching deductions.

With this optimistic belief the new board takes up RHODORA well pleased to note that, whereas in 1922 only 4 new botanists joined the ranks of contributors, the number of new authors increased in 1923 to 8, in 1927 to 10 and in 1928 to 17. If this rate of increase can be maintained we may look forward to a general use of the pages of the journal comparable with the happy state from 1899 to 1902. The New England Botanical Club, which sponsors RHODORA, itself contains approximately 225 members, selected because of their intelligent interest in our flora and the problems connected with it. Nevertheless, 104 members have never seen their names on the title-page of RHODORA. Whether the journal can continue to increase its contributing constituency depends very largely upon the Club itself.

The pages of RHODORA are not reserved, however, for members of the Club. They are freely open to all who care to use them, especially for the publication of tersely stated notes on range-extensions or new or unrecorded facts regarding habits, morphology, habitats or other features of interest to students of all plants (both vascular and cellular) or the natural history of plants. Systematic revisions and monographs of groups represented in the flora of northeastern America will be welcomed for editorial consideration and well-written and descriptive (but not prolix) accounts of explorations, containing a good share of new or significant observations, will be gladly considered. Mere lists without clear statement of the significance of the records are less desirable. Illustrations of new species and of newly recognized diagnostic characters are most desirable and in so far as limited resources allow they will be favorably consid-

ered for publication. Photographs of landscapes, unless they are remarkably sharp and of patent significance to the discussion, are undesirable for reproduction and, in general, RHODORA cannot commit itself to publish them. In such matters as nomenclature, punctuation, capitalization of specific names, modes of bibliographical citation, and other matters of form, contributors have full power to follow personal preferences, provided their usage is consistent with itself. Manuscripts which show serious lack of consistency will necessarily be returned for correction. In case of misquotations, erroneous citations and other inaccurate details in manuscripts the editors will naturally make corrections of obvious errors. They cannot, however, be expected specially to check such matters and it will be inferred that authors have themselves verified such essential details. Neither can the editorial board be held responsible, as some readers have heretofore supposed them to be, for all statements and conclusions presented by different authors. In the case of controversial subjects, with the desire to present both sides of a question, papers may be accepted for publication, though not representing the views of the editors.

When, thirty years ago, the board was seeking a suggestive and brief name for the new journal, Edward Rand, realizing that a technical scientific journal must frequently ask for financial aid from its sponsors, suggested *Taxus;* but it became evident that such a title, staring the subscribers in the face each month, would ultimately prove detrimental to the subscription list. One reason for originally selecting the name RHODORA, was the range of the shrub bearing that colloquial name: Labrador and Newfoundland to western Quebec, south to Pennsylvania. Any well-prepared and new material on the flora of this area is obviously appropriate for RHODORA; but the geographic limits covered by the journal are elastic and, space permitting, material from outside this area will be gladly considered.

THE APPLICATION OF THE TERM "RHIZOME."

THEO. HOLM.

(Plates 177 and 178.)

IT is a common fact that the subterranean organs of reproduction are either passed by in silence or incompletely described in Botanical

Manuals. The floral structure is, of course, the most important in such works, but characters derived from the vegetative organs of reproduction are also of importance to classification, and indeed very useful in large genera, where uniformity in floral structure is prevailing. The application of the proper terms to the various subterranean structures has also been a difficult matter, and the term rhizome, for instance, has caused great trouble to the systematists. And no wonder, because the morphologists have not, so far, come to any agreement as to its proper definition. Therefore we often see the term applied to almost any type of subterranean stems, rhizomes proper, stolons, tubers and the like; thus the diagnosis may give a wrong idea of the particular habit of some species. When, in the following pages, the writer presents some brief notes dealing with the term rhizome, it is with the intention to suggest how some improvement might be made, and with special reference to Gray's Manual.

The term has quite a history, and according to Link[1] Ehrhart[2] was the first author to employ the term for the rhizome of ferns; Link himself (l. c.) defined it as: "basis caulis intra terram demersa," and he mentions that some authors, for instance, Bernhardi and Willde- now use the term for the thicker portion of the root. Link distinguished between rhizome and tuberous stolons. Mirbel[3] did not use the term rhizome, but it occurs in the index of the terms as a synonym for "racine progressive," and some of the examples given are: *Gratiola officinalis*, *Polygonum bistorta*, *Convallaria polygonatum*, *Plantago major*, etc., with the important statement: "Les racines progressives sont, à proprement parler, des tiges enracinées." Seringe and Guillard[4] applied the term only to: "tiges souterraines et horizontales." By Lindley[5] rhizoma was defined as: "a prostrate thickened rooting stem, which yearly produces young branches or plants," chiefly found in *Irideae* and epiphytous *Orchideae*. According to De Candolle[6] a rhizome should be subterranean "caché sous terre"; *Arum*, *Nymphaea*, *Iris* and European ferns are cited as examples. Nevertheless, as early as the year 1833 the term must have been misused

[1] Link, H. F. Elementa philosophiae botanicae. Berlin, 1824, p. 129.
[2] Ehrhart, Fr. Beiträge zur Naturkunde IV, p. 44, 1787.
[3] Mirbel, Brisseau-C. F. Elémens de Physiologie végétale et Botanique. Pars 1, p. 91, Pars 2, p. 620. Paris, 1815.
[4] Seringe, N. C. et Guillard: Essai de formules botaniques. Paris, 1836, p. 116.
[5] Lindley, John. An introduction to Botany. London, 1832, p. 58.
[6] De Candolle, Alph. Introduction a l'étude de la Botanique. Vol. 1. Paris, 1835, p. 44.

to a great extent, for Bischoff[1] recommended to give it up altogether, having become an uncertain synonym for entirely different plant-organs. In North American manuals "rhizome" was introduced by Torrey in his flora of the State of New York (1843), and with but a few exceptions Torrey applied the term in the proper manner; these exceptions depended upon the fact that Torrey could not draw the distinction between rhizomes and stolons, notably in the case of the *Gramineae* and *Cyperaceae*. With regard to the *Orchidaceae* Torrey applied the term to *Goodyera*, but the rhizome of *Corallorrhiza* he called a root; the term "pseudo-bulb" adopted from Lindley was used for *Microstylis*, *Liparis*, *Arethusa*, etc., which shows that Torrey really observed that these plants have no bulbs in the stricter sense of the word, although described as possessing such by many systematists. With regard to *Dicentra Cucullaria* Torrey gives an excellent description viz: "Rhizome not creeping, bulbiferous, the bulbs formed of fleshy imbricated triangular scales (the thickened and persistent bases of petioles)."

It is interesting to compare this work of Torrey with that of Doell, published in the same year (1843)[2] because this author did not either draw any distinction between rhizomes and stolons in the case of the *Gramineae* and *Cyperaceae;* Doell, however, described the rhizome of *Corallorrhiza* in the correct manner. Very characteristic of Doell's Flora (l. c.), besides his Flora of Baden,[3] is the morphological treatment of the inflorescences and floral structures, notably in the *Gramineae* and *Cyperaceae*, which is far superior to that by Torrey and subsequent authors of American manuals. Morphological studies were altogether given much attention in Germany at that time; we need only to cite such fundamental works as those of Irmisch,[4] and Alexander Braun,[5] followed soon by numerous others. However, so far as concerns the definition of the subterranean stem-structures the first edition of Gray's Manual[6] corresponded fairly well with that given by his contemporaries. As

[1] Bischoff, G. W. Handbuch der botanischen Terminologie. Vol. 1, p. 124. Nürnberg, 1833.

[2] Doell, J. Ch. Rheinische Flora. Frankfurt a. M., 1843.

[3] Doell, J. Ch. Flora des Grossherzogthums Baden. Carlsruhe, 1857–1862.

[4] Irmisch, Thilo. Zur Morphologie der monokotylischen Knollen-und Zwiebelgewächse. Berlin, 1850.

[5] Braun, Alexander. Betrachtungen ueber die Erscheinung der Verjüngung in der Natur. Leipzig, 1851.

[6] Gray, Asa. Manual of the Botany of the Northern United States. Boston and Cambridge, 1848.

shown in the dedication of this volume to Torrey, Gray acknowledged the importance of the help he had received from this author from the commencement of his botanical pursuits. Considered in a general manner Gray adopted the terminology used by Torrey, but he used the term root-stock instead of rhizome. The definition given by Gray (l. c., p. XIV) of "rootstock or rhizoma" reads: "Usually horizontal, sending off roots from the under side or the whole surface, and advancing from year to year (being always perennial) by the growth of the bud at its apex" is not quite complete, but certainly more significant than the definition given in Gray's New Manual (1908) viz: "Any prostrate or subterranean stem, usually rooting at the node and becoming erect at the apex." Although Gray defined "tuber" as a portion of a subterranean stem, which is thickened by the deposition of nutritive matters, differing from a rhizome in being borne on a slender stalk, he described *Dicentra Cucullaria* as having a cluster of grain-like tubers, although Torrey had described this very correctly; moreover Gray called the tuberous roots of *Claytonia, Erigenia, Nabalus* and some others "tubers." Considering the early publication (1848) errors of that kind are excusable, and there are relatively only a few of them. And, when we compare the work of Grenier and Godron,[1] published in the same year as Gray's Manual, we must certainly admit that both Torrey and Gray had used the term rhizome or rootstock much more correctly. While the term "souche" according to Littré,[2] means: "le bas du tronc d'un arbre accompagné de ses racines et séparé du reste de l'arbre," this term is frequently used by French authors for herbs. For instance Grenier and Godron use "souche" for the subterranean stems producing stolons: *Epilobium, Sium, Geum*, etc., as well as for the tuber of *Arum*, and the rhizome of *Iris*, while *Acorus, Calla, Nymphaea*, etc., are described as possessing rhizomes; on the other hand, the rhizomes of *Goodyera* and *Corallorrhiza* are called "racine." In Germany the term rhizome became well defined by several authors, notably by Schacht,[3] and the examples he cites are characteristic: *Iris, Acorus, Convallaria, Corallorrhiza, Goodyera*, etc. At that time, we might say since 1843, morphological botany made wonderful progress, founded by Mirbel

[1] Grenier et Godron. Flore de France, Paris, 1848.
[2] Littré, E. Dictionnaire de la langue Française. Paris, 1876.
[3] Schacht, H. Lehrbuch der Anatomie und Physiologie der Gewächse. Pars 2. Berlin 1859. p 21.

in France, and actually continued by the Germans, and with great success. As an example of the beneficial effect, these morphological studies had on systematic botany we may cite Ascherson's Flora,[1] a work containing excellent diagnoses of the species, and with the subterranean organs correctly defined; in this work *Cirsium arvense* and *Rumex Acetosella* are described as multiplying by means of root-shoots, and not by "running rootstocks." While subsequent authors in Europe availed themselves of the profuse material brought together in the literature, the various editions of Gray's Manual were not brought "up to date," at least not with reference to the morphology of the vegetative organs. Even in the last edition (1908) there is frequently no clear distinction drawn between the various types of subterranean stems, rhizomes, tubers, stolons, etc. This is especially noticeable in the treatment of the *Orchidaceae*, where the tubers of *Pogonia trianthophora* are described as "tuberoids" = roots, where bulbs are attributed to *Calopogon*, *Arethusa*, *Microstylis* etc., although not a single member of this family possesses a bulb, but true tubers or rhizomes. In the *Gramineae* "running rootstocks" is the only characterization of the subterranean stem, although most of these are simply stolons. Furthermore "creeping rootstocks" are attributed to *Cirsium arvense* and *Rumex Acetosella*, by Irmisch correctly described as "root-shoots," and recorded as such by Ascherson (l. c.); the tuberiferous stolons of *Krigia* are called roots, while the roots of *Claytonia*, *Nabalus* and *Erigenia* are called tubers. In other words the errors committed in the first edition have not been corrected, and several others have been inserted.

Meanwhile it must be admitted that systematic works even of a more recent date do not always give the exact definition of the subterranean structures. And, moreover, it is not seldom to be seen that some of the terms, notably "rhizome," are applied to organs, which are not rhizomes, by authors of morphological works. No serious attention was given to the matter until Warming[2] made the suggestion, that the term "Rhizome" should be restricted to horizontal subterranean stems with short, generally thick internodes, rich in nutritive matters, and frequently with only a few roots (*Anemone nemorosa*, *Polygonatum*, *Scrophularia nodosa*, *Dentaria bulbifera*). Warming, furthermore, expressed the belief that rhizomes

[1] Ascherson, Paul. Flora der Provinz Brandenburg. Berlin, 1864.

[2] Warming, Eug. Om Jordudloebere. Kgl. Danske Vid. Selsk-Skrifter. Series 8, II, 6. Kjoebenhavn, 1918, p. 299.

most frequently represent the primary axis, developed directly from the plumule. The material studied by this author was principally of Scandinavian origin, a fact that may explain the somewhat narrow definition of the term. This suggestion that rhizomes might be restricted to the primary axis, appears to the writer as exceedingly important; we only wish to alter the expression "might be restricted" to "must in the future be restricted."—This would facilitate the proper application of the term, but would, of course, involve studies of the seedling stages in order to see the further growth of the plumule. But even if so, studies in that line would be of great value to the knowledge of the biology of the plants, especially of the North American, known but so very imperfectly from this particular point of view. With regard to the European plants, they are known so well, that the definition of the subterranean stem as a rhizome would cause no difficulty of consequence. Moreover, the various subterranean stems of the North American species may be fairly well understood by comparison with the results given in the copious literature published abroad on this subject, even if based upon material mostly European.

Before describing some examples of rhizomes of North American species, the writer wishes to refer to the literature presented some few years ago,[1] where the seedling-stage has been described, beside the further growth of the plumule.

We might state at once, that rhizomes may be horizontal or vertical, homogeneous or heterogeneous, monopodial or sympodial, root-bearing or rootless, the latter being only represented by *Corallorrhiza* and *Hexalectris*. Although the tuber of *Arisaema*, and the bulbs of various *Liliaceae* are developed directly from the plumule, we do not include these under rhizomes, since they are so very distinctive, and should therefore be defined simply as respectively tuber and bulb; the term "corm" as exemplified by *Crocus*, *Colchicum*, *Gladiolus* and certain species of *Iris*, does not appear to be represented by any of the plants described in Gray's Manual, and will therefore be omitted. On the other hand, the distinction between rhizome, stolon and runner, difficult as it be, will be briefly touched upon in the subsequent pages.

[1] Holm, Theo. Hibernation and rejuvenation exemplified by North American herbs. The American Midland Naturalist. Vol. IX, 1925.

I. HORIZONTAL, HOMOGENEOUS RHIZOMES.

Tripsacum dactyloides L. The seedling (fig. 2) shows the thin, primary root (R), and several relatively thick secondary roots, developed from the internodes of the primary axis. This axis is almost erect, and consists of four internodes, terminated by a vegetative growing point with a few green leaves, and with a lateral bud. In the succeeding year (fig. 3) axillary buds have developed, each with an adorsed fore-leaf or prophyllon (P), which is sharply two-keeled as shown in the cross-section (fig. 4). The growing point is still purely vegetative, and remains so until the development of the first culm; after that time a lateral bud takes its place, thus the ramification of the shoot becomes changed from a mono- to a sympodium. By the continued growth the primary axis becomes appressed to the ground, and lateral branches soon develop; thus the mature rhizome represents a tangled mass of thick, very short internodes, and bears many green leaves. The root-system is well represented, especially on the lower face of the rhizome. With the exception of the membranaceous fore-leaves all the other leaves are green, the rhizome being close to the surface of the soil, and often freely exposed to the light, at least the upper face of the axes. Similar homogenous rhizomes with all the internodes of the same thickness, and with green leaves occur also in *Acorus*, *Iris versicolor* L., *Goodyera*, *Nymphaea* and several species of *Viola: V. papilionacea* Pursh and its allies. More frequent, however, are rhizomes, which bear scale-like leaves preceding the aerial, green ones, as in *Uniola gracilis* Michx., *Panicum virgatum* L., *Eleocharis tenuis* (Willd.) Schult. and several other species, *Dulichium*, *Scirpus Americanus* Pers., etc., *Fuirena scirpoidea* Michx., several species of *Carex* (*Vignea*), of *Juncus*, for instance *J. scirpoides* Lam., *Smilacina*, *Polygonatum* (fig. 1), *Smilax herbacea* L., *S. tamnifolia* Michx., *Chamaelirium*, *Oakesia*, *Dioscorea* and several others. Among the *Dicotyledones* this type of rhizome is represented by *Podophyllum* (fig. 8), *Sanguinaria*, *Dentaria diphylla* Michx., and *Asarum*, but is relatively rare.

Among the rhizomes of the latter category, with scale-like leaves, are several of which the internodes are not exactly of the same thickness as, for instance, in *Polygonatum*, *Smilacina* and *Podophyllum*, where the internodes bearing the floral stems are distinctly thicker than the others, but of the same cylindric form; thus the rhizome may well be called homogeneous. Characteristic of the rhizome of *Viola*

is, that the bases of petioles and stipules persist and increase in thickness, becoming quite fleshy. In *Dentaria diphylla* the scale-leaves are quite thick and fleshy, while in the other examples mentioned these leaves are membranaceous and very thin.

There are thus some distinct forms observable in this type of rhizome: the horizontal, homogeneous, but common to all of these, except the *Viola papilionacea* alliance, is the monopodial structure until the production of the first floral stem, when the sympodium begins. As regards *Viola* the rhizome remains a monopodium throughout the life of the individual, being terminated by a rosette of leaves subtending the flowers; among the caulescent Violets this same structure recurs, for instance in *V. scabriuscula* Schwein. and *V. striata* Ait.

II. Vertical, Homogeneous Rhizomes.

This type is rare. It occurs in *Gentiana villosa* L. (fig. 7), and is relatively stout, with several thick, fusiform roots, very short internodes, and bearing only thin scale leaves. The ramification is monopodial throughout the life of the plant, and green leaves do not appear until upon the flower-bearing stem. In *Viola pedata* L. the rhizome is also relatively stout and monopodial, but all the leaves are green, forming a dense rosette with several to many axillary flowers. A corresponding, but very robust rhizome is possessed by *Symplocarpus foetidus* (L.) Nutt. In *Panax quinquefolium* L. and *P. trifolium* L. the very short rhizome is of several, short internodes bearing scale leaves, exactly alternate, and with the primary root persisting: large, fusiform in the former, small, globose in the latter species; the shoot is a monopodium until the first floral stem becomes developed. A similar, very short rhizome is exemplified by *Hepatica triloba* Chaix var. *americana* DC.; the terminal bud, purely vegetative, is surrounded by several membranaceous scale-leaves, besides that the green leaves from the preceding year's growth form a rosette around the bud. The very short rhizome, of only two to three internodes, in *Viola primulifolia* L. and *Uvularia perfoliata* L. persists only for two or three years, when axillary stolons develop and produce new individuals showing exactly the same structure as the mother plant, the primary axis. Finally in the genus *Carex* it is a marked characteristic of the grex *Lejochlaenae*, besides several species of *Dactylostachyae* that the primary axis persists for several years as a true monopodium with all the flower-bearing stems being axillary.

While thus the primary axis passes from a mono- to a sympodium after the first flowering in *Panax*, it remains a monopodium in all the other genera described, throughout the life of the shoot.

III. HORIZONTAL, HETEROGENEOUS RHIZOMES.

An alternation of single, or series of several slender internodes with tuberous internodes makes the structure of the rhizome heterogeneous. It is a type almost confined to the *Monocotyledones*, and especially well represented in the *Orchidaceae*. The simplest structure is shown by *Dentaria laciniata* Muehl. (figs. 10–11), where the plumule at once develops into a small tuber, bearing a green leaf, and a scale-like, covering the minute, apical bud. The fully matured rhizome (fig. 11) consists of a horizontal chain of oblong tubers, separated from each other by one to two very thin internodes, each tuber representing the growth of one season. Similar to *Dentaria diphylla* Michx., the structure is monopodial until the production of the first flowering stem. It is a structure agreeing with that of *Cyclamen*, *Umbilicus*, *Eranthis* and certain species of *Corydalis* so far as concerns the development of the plumule into a tuber, but in these genera the primary tuber does not branch any further, but persists as a single tuber throughout the life of the individual. *Cardamine Douglassii* (Torr.) Britt. (fig. 6) has also a tuberous rhizome interspersed with slender internodes, but so irregularly, that the structure, mono- or sympodial, can not be determined. *Hydrophyllum Canadense* L. shows the peculiar structure of a series of relatively large, very thick and fleshy scale-leaves preceding two green leaves, which again surround another series of scale-leaves with the floral stem in the center. Very regular, and much more distinct is the rhizome of *Medeola virginiana* L. (fig. 5), where the large tuber of three internodes passes, sympodially, into a long, very slender internode terminating in another tuber.

In *Fuirena squarrosa* Michx. we observe the development of erect tubers intermixed with slender, flower-bearing shoots on a horizontal rhizome.[1] The growing apex of the tubers is arrested in its further development. This structure seems to be a very rare case in the *Cyperaceae*, for in this family tubers are either developed at the apex of stolons as in *Cyperus phymatodes* Muehl., *Scirpus robustus* Pursh and several other species, or they form a regular chain as in

[1] Holm, Theo. Fuirena squarrosa Michx. and F. scirpoidea Vahl. Am. Journ. of Sc. IV, 1897, p. 13.

Cyperus filiculmis Vahl., *Scleria pauciflora* Muehl., and several other species.

With regard to the *Orchidaceae* heterogeneous rhizomes represent a multitude of types, and several are well exemplified by North American genera. The study of these structures has been facilitated to a very great extent by the classic investigations of Irmisch, Pfitzer and Reichenbach, but they must be studied in nature, not in herbaria. So long as we know that neither bulbs nor corms exist in this family as shown by Pfitzer,[1] the matter has become very much simplified, and a brief characterization of the genera contained in Gray's Manual may be sufficient. In *Corallorrhiza odontorhiza* Nutt. the coral-like rhizome is heterogeneous, because the branch developing into an aerial, floral shoot, forms a small tuber from which the floral stem emerges. In *Corallorrhiza trifida* Chatelain, on the other hand, the non-development of this tuber makes the rhizome homogeneous as in *Hexalectris*. In *Aplectrum*, *Tipularia* and *Calypso* there is an alternation, and very regular, of tubers and slender internodes; of these the tubers are terminated by a vegetative bud, which remains dormant, thus each tuber is a monopodium, while the total rhizome represents a sympodium; furthermore in *Aplectrum* and *Calypso* a secondary rhizome is also developed in the manner exactly like that of *Corollorrhiza*, coral-like and much branched, which may be found occasionally beneath the tuber, especially in young specimens.

The tuber of *Calopogon* resembles that of *Aplectrum* and the two other genera, but the apex grows out as a small shoot with one scale-leaf, and one green leaf, surrounding the base of the terminal inflorescence; in *Aplectrum*, *Tipularia* and *Calypso* the inflorescence is axillary. In *Arethusa* the tuber consists of two internodes, of which the apical represents the base of the floral scape. A corresponding participation of the floral stem in forming the tuber recurs in *Liparis* and *Microstylis*. It might appear by a superficial glance as if "rhizome" ought not to be attributed to *Arethusa*, *Liparis* and *Microstylis*, since no slender internodes are actually visible; the tubers of these genera, however, are not single, but represent a part of a horizontal rhizome, of which the older portions are very frequently preserved, even if in a withered condition.

[1] Pfitzer, Ernst. Grundzüge einer vergleichenden Morphologie der Orchideen. Heidelberg, 1882.

Pfitzer, Ernst. Orchidaceae in Engler und Prantl. Die nat. Pflanzenfam Leipzig, 1888.

Finally we might mention the so-called "pseudo-rhizome" a term proposed by Nilsson.[1] It simply applies to a complex of persisting stem-bases, with their buds and system of roots. It is exemplified by *Phryma leptostachya* L. (fig. 12), and a number of other plants, *Collinsonia*, many *Leguminosae*, etc. But in this subterranean stem, the primary axis is not the sole one to develop into a persisting organ, but the cotyledonary shoots take also a part in its formation, and the final structure is very variable, but generally more or less tuberous. The persisting basal internodes generally show a well marked increase in thickness, and a more or less pronounced lignification of the stelar tissues.

These various structures described above, may be sufficient for defining the subterranean stems as representing a rhizome. The difficulty depends on distinguishing them from stolons, at least in the *Gramineae* and some of the *Cyperaceae*, when their origin as axillary stems can not be proved; for stolons are always axillary and subterranean; runners are also axillary, but aerial (*Fragaria*, *Antennaria*, *Erigeron*, *Cynodon*, etc.). In several genera of the *Labiatae* for instance, the stolons are terminated by tubers, and thus readily to be determined, but in the *Gramineae* and *Cyperaceae*, notably in *Carex*, the stolons may resemble rhizomes. However, it appears to be a constant character of the stolons in these families that they do not bear green leaves, only membranaceous, scale-like, as we know them from *Agrostis*, *Distichlis*, *Poa*, *Glyceria*, *Agropyrum*, *Muehlenbergia*, *Carex* and several other genera. They always show a different, internal structure from the axis that bears them, while branches of rhizomes show the same structure as the main rhizome itself. Considered at the seedling-stage the *Gramineae* and *Cyperaceae* seldom show distinctly the development of the plumule into a rhizome as shown in *Tripsacum* (fig. 2), at least not in the first or second year. In the caespitose as well as in the stoloniferous species the plumule shows some few green leaves, and the final structure, caespitose or stoloniferous, does not appear until the third or fourth year's growth, when the stolons appear, and as lateral branches from the very short, primary, erect axis. It is often difficult in these two families to decide in mature specimens whether a rhizome or stolons are present, but we must bear in mind that this particular subject has been very comprehensively treated by writers on morphology, and the litera-

[1] Nilsson, N. Hj. Dikotyla jordstammar. Acta Univ. Lund. Vol. 19, 1882–1883.

ture is copious. Moreover stolons are generally slender; *Triadenum* is the only genus, we know of, in which the stolons are composed of thick, fleshy internodes, thus resembling a rhizome. Further investigations of this subject are necessary, however; the object of presenting these notes was to show that the term "rhizome" when applied in the proper manner may as a vegetative structure contribute to the distinguishing of genera or species, as a character supplementary to the floral. The reason, why the writer selected Gray's Manual as a starting point for this discussion, was simply, because we consider it the standard work on American systematic botany. If a future edition of this manual would be elaborated so as to include the morphology of the vegetative organs of reproduction more completely than has been the case heretofore, it would render great assistance to the study of the North American Flora.

Clinton, Maryland.

Explanation of Plates 177 and 178.

Plate 177.

Fig. 1, Polygonatum biflorum. Rhizome of a mature specimen; St. = base of floral stem. Fig. 2, Tripsacum dactyloides, the seedling; R. = the primary root. Fig. 3, same species, a young specimen; P. = the prophylla. Fig. 4, same species, cross-section of the prophyllon. Fig. 5, Medeola virginiana, rhizome of mature specimen, letter as above. Fig. 6, Cardamine Douglassii (Torr.) Britton, rhizome of mature specimen, letter as above. All the figures except fig. 4 are about natural size.

Plate 178.

Fig. 7, Gentiana villosa, rhizome of mature specimen, letter as above. Fig. 8, Podophyllum peltatum, seedling in its third year, letter as above. Fig. 9, Hydrophyllum canadense, rhizome of mature specimen; L. = green leaves, St. = flowering stem. Fig. 10, Dentaria laciniata, seedling showing the one cotyledon free (Cot.), the other enclosed in the seed; L. = the first developed leaf. Fig 11, same species, a mature rhizome; letter as above. Fig. 12, Phryma leptostachya, the pseudo-rhizome of a mature specimen, letter as above. All the figures are about natural size.

Roripa islandica an invalid Name.—Since I followed[1] Schinz & Thellung in taking up for *Roripa palustris* (L.) Bess. the name *R. islandica* (Oeder) Schinz & Thellung, my attention has been directed by Dr. Theodor Holm and also by Mr. Kenneth Mackenzie to the fact, overlooked by me, that the basis of Schinz & Thellung's combination is insecure, since Oeder did not unequivocally publish the binomial *Sisymbrium islandicum*, as has been asserted. Instead, Oeder

[1] Fernald, Rhodora, xxx. 132 (1928).

merely designated the plant by a polynomial, with the queried word "islandicum" in parentheses: "*Sisymbrium*, (islandicum?) *siliquis brevibus*" etc. This is certainly not a clear publication of the binomial *S. islandicum* and I was in error in following Schinz & Thellung without verification. Incidentally, although it is now of but slight importance, Dr. Alfred Becherer of Basel calls my attention to the fact that the combination *Roripa islandica* goes back to Borbás, Balaton Tavának és Partmellékének, 392 (1900), where the combination is published, with *S. islandicum* Oeder as its basis. Under the International Rules *Roripa palustris* (L.) Bess. seems to be the correct name.—M. L. FERNALD, Gray Herbarium.

HYDRANGEA PANICULATA NATURALIZED IN MASSACHUSETTS.

R. J. EATON.

EARLY in September, my brother, F. W. Eaton reported that he had seen from the road a conspicuous patch of *Hydrangea*, well established in a swamp in Lincoln, Massachusetts, about three-quarters of a mile northeast of the village, and within a stone's-throw of cultivated farm land. I visited the place, and was amazed to find a veritable tangle of *Hydrangea* in full flower, growing in a peaty maple swamp which had been partially cleared perhaps five years ago, judging from the size of those maple sprouts which have successfully competed with the Hydrangea. Although this shrub constitutes the dominant growth in an area of about two acres, other plants such as *Rhododendron viscosum*, *Vaccinium*, *Clethra*, and *Rubus*, were noted in some abundance. Generally speaking, the Hydrangea grew in rather dense irregular clumps at an average height of 1.5 meters. The tallest specimen to be found, growing as a single wand-like sapling on the edge of the clearing in partial shade, was over three meters in height. Most of the clumps were in full sunlight, and bore scores of flowering panicles. Judging from the diameter of the woody stems, ranging from four to eight centimeters at the ground, and from the large number of individual plants growing in a maximum area of perhaps three acres, it is quite probable that the Hydrangea was thoroughly established many years ago. Presumably, it bloomed sparsely if at all while shaded by the maple growth, and became conspicuous only after the trees were cut off. It is probable but not

clearly established that the plants have been propagated by seed. There is no direct evidence of rooting at the tips of the recurved branches. The flowering panicles contain relatively few neutral flowers. About 90% of each inflorescence consists of fertile flowers developing into mature and dehiscing capsules and apparently producing ripe seeds.

Collections from this station have been identified by Prof. M. L. Fernald as *H. paniculata* Sieb., a native of China and Japan. It is said to be the hardiest member of the genus. Originally introduced into America about sixty-five years ago, it has shown no marked disposition to escape from cultivation. In fact, there is no mounted material from naturalized stations to be found at all at the Gray Herbarium, at the Arnold Arboretum, at the New York Botanical Garden, or at the Herbarium of the N. E. Botanical Club. So far as can be learned from such authorities as Fernald, Rehder, and Britton this species has never yet been reported as naturalized in North America. One record only of its escape in New England has been brought to my attention, and that one unimportant, *viz:* in Rhodora XIX: 226 where a plant near a railroad is reported from Connecticut with the erroneous statement that it is a fugitive from the Southern States.

Specimens from the Lincoln station have been deposited in the Gray Herbarium.

Cambridge, Massachusetts.

Victorin's Les Gymnospermes du Québec.[1]—Another detailed monograph from the hand of Brother Marie-Victorin has recently been published. This follows the papers on the ferns and fern-allies and takes up in the same way the Gymnosperms of Quebec. As in the other monographs there are two parts—Révision et Discussion, and Traité Systématique. The former covers only 27 pages, because the nomenclature has been previously discussed in another paper.[2]

Particularly interesting is the discussion of the white and black spruces and their forms, for Brother Victorin recognizes no varietal distinctions in the Quebec species of this genus. He describes one new form, forma *parva*, which he illustrates with three fine half-tone

[1] Les Gymnospermes du Québec. Par Frère Marie-Victorin. xiv + 144 pages, 38 figures et un frontispice. 1927. $1.00. (Contrib. Lab. Bot. Univ. Montréal No. 10.)

[2] Notes pour servir à l'histoire de connaissances sur les Abiétacées du Québec. Par Frère Marie-Victorin. 1926. (Contrib. Lab. Bot. Univ. Montréal No. 7.)

pictures. This is found on the high mountains, on the shore of the Gulf of St. Lawrence, and in northern Ungava. "Trunk very short (1–2 m.), often rather stout (diam. 10–20 cm.), often almost lying on the ground, with the head developed all to one side; branches very numerous forming a close-knit carpet (feutrage)." Thus it is said in Canada that "In Anticosti you walk on the treetops." The corresponding form of *Picea mariana* is forma *semiprostrata* (Peck) Blake.

Picea rubra is included on the basis of one herbarium specimen, and *Juniperus virginiana* on one station, near Hull. The other species are better distributed, and excellent maps show the ranges at a glance.

The monograph contains a great deal of valuable information about forestry, and the uses of the woods today and in the past. The fungi and insects which prey on the Gymnosperms are studied in considerable detail.

Brother Victorin gives many facts of interest about the every-day French names of these trees and shrubs. The early settlers of Canada were from a part of France where there were few relatives of the Canadian species, and so evolved their own names for the trees they found in Quebec. Thus *Pinus Banksiana* came to be called cyprés; *Larix laricina*, épinette rouge (among the Acadians violon and hacmatack); *Picea canadensis*, épinette blanche; *Picea mariana*, épinette noir; *Tsuga canadensis*, pruche (in the Magdalen Islands haricot); *Abies balsamea*, sapin; *Taxus canadensis*, buis.

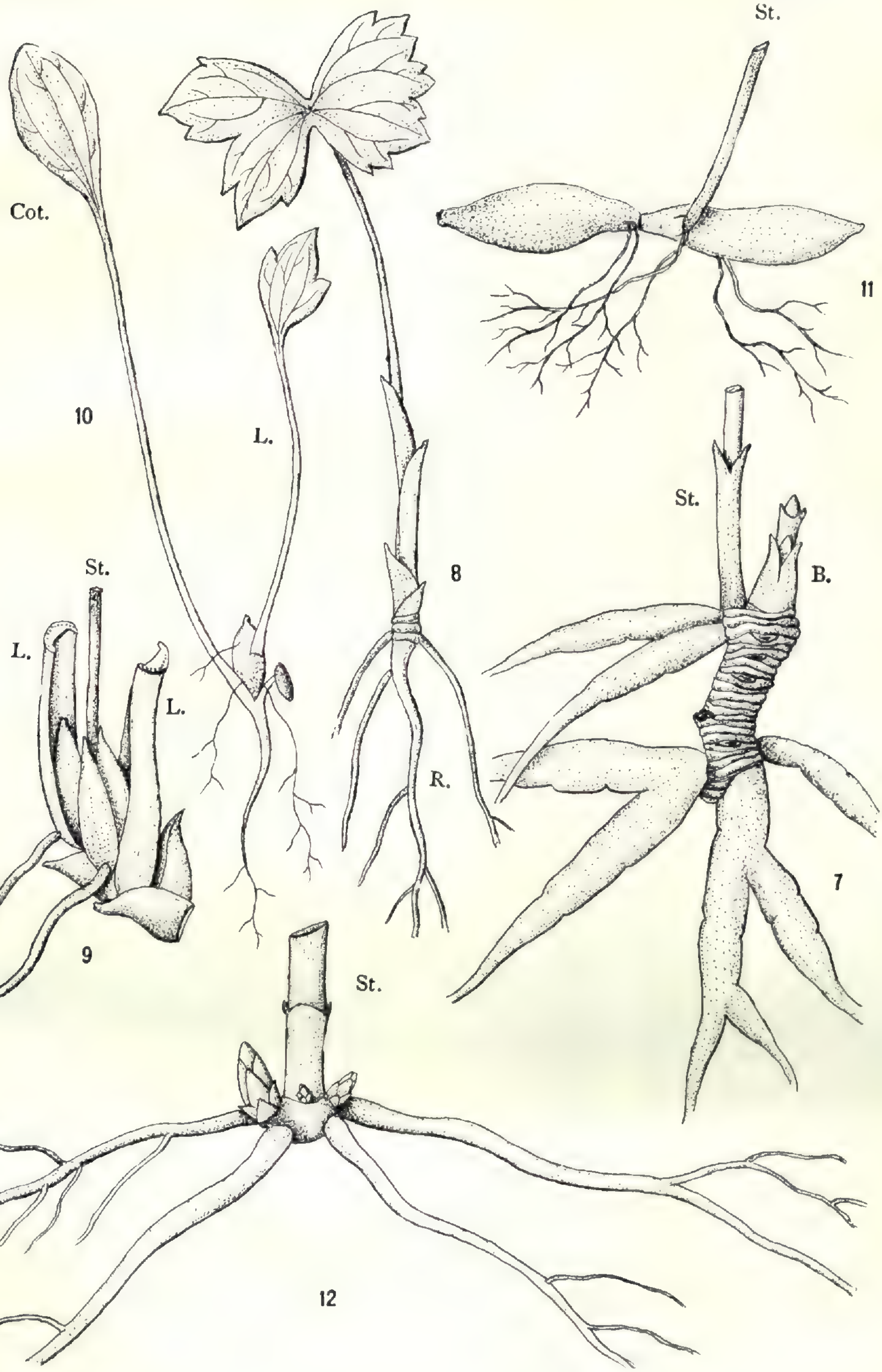
There are many interesting bits of folklore given about the gymnosperms, for these trees were very important in the lives of the early settlers, as well as today. There is included, among other things, a very complete recipe for the manufacture of *bière d'épinette* from the young shoots of *Picea mariana*.

All these interesting bits of general information add much to a monograph which is already rich in its scientific details. The facts about the ranges have been worked out with an infinitude of care, the descriptions of species, varieties and forms are full and accurate, and there are an abundance of diagrams and figures, many of the latter from photographs. The excellent quality of the paper and printing should also receive favorable comment.—CLARENCE HINCKLEY KNOWLTON, Hingham, Massachusetts.

Vol. 30, no. 360, including pages 229 to 258 and title-page of the volume, was issued 24 January, 1929.

Theo. Holm del.

HOLM ON RHIZOMES



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HOLM ON RHIZOMES

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. LXXXIII.

I. SCHMIDEL'S PUBLICATION OF THELYPTERIS

M. L. Fernald and C. A. Weatherby

(Plate 179.)

Since various Old World and some American botanists have objected to the taking up of *Thelypteris* Schmidel, Icon. Pl. ed. 2: 45, tt. 11 and 13 (1762) in place of *Dryopteris* Adans. Fam. Pl. ii. 20, 551 (1763), as interpreted by Kuntze, Underwood and Christensen, we ought, perhaps, to explain the reasons for holding to *Thelypteris*. And since there is impending a botanical congress at which nomenclatural questions may be discussed and decided, we permit ourselves the hope that a restatement of the case may lead to some definite and desirable result.

Woynar (Hedwigia, lvi. 385, footnote (1916)), followed by Schinz and Thellung (Vierteljahrsschr. der Naturforsch. Gesellsch. Zürich, lxvi. 257 (1921)), has argued that Schmidel was not proposing a new genus, but merely applying the name *Thelypteris* Ruppius; that the "primary element" of Ruppius's genus was *Pteris aquilina* L.; that this species must, therefore, be regarded as the type of *Thelypteris* Schmidel, which thus becomes a mere synonym of *Pteris* L. The argument is based on Schmidel's discussion of the proper systematic position of *Thelypteris palustris non ramosa* of Ruppius, in his preface (3rd page; the pages are not numbered), and particularly on the remark that the plant "vera existat species Thelipteridis si hujus character in seminibus sub margine reconditis ponitur" ("stands as a true species of *Thelypteris*, if its character consists in the hiding of the seeds under the margin").

Woynar may be, and in all probability is, correct as to his premises. But the purely historical method of typification by which he arrives at his conclusion is nowhere sanctioned by the International Rules and seems to be discouraged by the examples given under Art. 45. It is, moreover, essentially a violation of the rule that botanical nomenclature of the vascular plants begins with 1753 (Art. 19). Pre-Linnean literature must often be consulted to determine identities; but the *names* in it have now no legal standing, and to use them, as Woynar does, as strict name-bringing synonyms, is simply to ignore 1753 as a point of departure. It may be granted that Schmidel was not seeking to establish a new genus, but only to select from generic names already available one which could be properly applied to the plant he had in hand. But, having made his selection and applied his name, for the first time after 1753, to a single unmistakable species, with which no other is mentioned as congeneric, he thereby fixed the correct use of the name for subsequent authors; and he ought to be followed, regardless of where in pre-Linnean literature he got the name and in what sense the original author had used it.

Woynar (l. c.) further remarks, incidentally, that the priority of *Thelypteris* is very questionable ("höchst fräglich"). But he gives no evidence whatever in support of his statement, and, so far as we know, neither he nor anyone else has ever given any. It is the universal and proper custom to hold the dates on botanical title-pages innocent of deception until proved guilty; in default of proof, Schmidel's 1762 must be taken at its face value.

Nakai (Bot. Mag. Tokio, xl. 61 (1926)) argues that, though Schmidel's "figures are so good as no one can make a mistake with other than *Dryopteris Thelypteris* . . . no generic character [is] given in the description. Explicatio figurarum suffixed is the explanation of the figures which is designated by him as '*Thelypteris palustris non ramosa.*' So his *Thelypteris* could not be considered as a generic name, but simply as a vague significance of a group of plants." Mackenzie (Amer. Fern. Journ. xvii. 117 (1927)), developing this line of attack (at which he appears to have arrived independently) concludes that *Thelypteris* is a sort of Latin vernacular term, strictly equivalent to the English "marsh fern," and an example of the uninomial nomenclature expressly forbidden by the International Rules (Art. 54, par. 2).

It appears to us that these authors, in stating that Schmidel did not distinguish between genera and species and that he gave no generic description, have not given sufficient weight to Schmidel's preface. The passages concerned are too long to quote; but to anyone who will take the trouble to conquer his rather involved Latin, it should be plain that Schmidel understood very clearly the difference between species, genera, and larger groups, and that he not only used his names in a generic sense, but spent much pains in choosing such as would apply correctly to the plants he was illustrating. One is not thus particular about vernacular appellations, Latin or otherwise.

As to generic description, there is a phrase of it in the passage from the preface quoted at the end of our second paragraph. It is informal and even tentative (Schmidel was evidently not wholly sure of his ground), and it is not a correct definition of *Dryopteris* as now understood. It is, however, accurate enough for the single species with which Schmidel was dealing, in which at least the young sori are commonly covered by the reflexed margins of the pinnules; and it may be held to fulfill technical requirements.

In any case, description in words is not always essential for generic publication. Art. 38 of the International Rules, indicating methods of publishing (or rather not publishing) genera, refers back to Art. 37, where specific publication is discussed. Art. 37 consists chiefly of negatives; the one positive definition is as follows: "Plates accompanied with analyses are equivalent to a description; but this applies only to plates published before January 1, 1908." Schmidel had two plates, one showing the habit of the plant, the other (our Pl. 179) giving in exquisite detail the analyses: enlargements of pinnae to show venation, young indusia and mature sori, magnified indusia, sporangia and spores, all so good that, as Nakai says, no one can mistake the plant for anything but *Acrostichum Thelypteris* L. The fact, noted by Nakai, that the habital plate (the other has no caption whatever) is "designated .. *Thelypteris palustris non ramosa,*" appears not to be important. It is difficult to illustrate a genus without also illustrating at least one of its component species; and where, as in this case, there is only one, the line between generic and specific diagnosis becomes hard to trace.

It would appear, then, that by the statements of the International Rules, *Thelypteris* was properly published.

It will be noted, and may not be without significance, that there

is a considerable lack of unanimity among the objectors to *Thelypteris*. Woynar and Schinz and Thellung find nothing wrong with its publication; Nakai and Mackenzie find nothing wrong with its typification. Each group accepts without question what the other rejects.

It may be added that *Thelypteris* was used by Schott in his splendid redefinition of the genera of ferns (Gen. Fil. ad t. 10) in the strict sense of Schmidel for the immediate group of the marsh fern; was taken up by Miss Slosson in Rydberg, Fl. Rocky Mts. 1043 (1917) to cover *Dryopteris* subgenus *Lastrea* of Christensen; and in the larger sense, as the equivalent of *Dryopteris* of Christensen, was revived by Nieuwland (Am. Midl. Nat. i. 226 (1910)) and again by Weatherby (Rhodora, xxi. 174, 177 (1919)).

Dryopteris has been much discussed, but, for the sake of completeness of statement, it may be worth while to go over again some of the well-trodden ground. Adanson's description, as compiled from the headings of his tabular synopsis, is as follows: "Paquets de fleurs Ronds, disposés sur 2 rangs sous chaque division des feuilles. Enveloppe enparasol. Globules environnés d'un anneau élastique." Only the phrase "enveloppe enparasol" applies exclusively to *Dryopteris;*[1] it is therefore, in a strict sense, its diagnosis, *i. e.* the character by which alone *Dryopteris* is to be distinguished from other genera to which the other characters given also apply.

For the rest, we can do no better than quote Nakai. "By 'enparasol' one could be easily led to consider it as *Aspidium* [as limited by Diels] or *Polystichum;*" and Nakai goes on: "H. W. Schott used *Dryopteris* also in 1834, and A. Gray in 1856 [actually 1848]. Since then it had been long neglected till O. Kuntze applied it in 1891. Kuntze's combinations are often too much even for a generous botanist; hence *Dryopteris* would have been buried eternally in the dust of synonyms if Dr. Christensen had not picked it again and made the laborious combinations in his Index Filicum." Nakai then goes on to show that, when it came to naming specimens, Adanson had no clear conception of *Dryopteris* such as that of Christensen and that the phrase "enveloppe enparasol" was sometimes properly used by him, since in his herbarium there are included in *Dryopteris* 5 species with shield-shaped indusia, nowadays put into *Polystichum;* but more often not, since 8 other species included were *Dryopteris* of Christensen, and the remainder belonged in six other

[1] "paquets de fleurs Ronds . . ," for instance, covers also *Filix* and *Polypodium*.

genera, such as *Asplenium*, *Athyrium*, and *Cystopteris*. How much more definite is Schmidel's *Thelypteris*, beautifully illustrated by analyses the identity of which cannot be doubted![1]

Mackenzie (l. c. 121), arguing against the "strained" interpretation[2] of "enparasol" as peltate, maintains that by this phrase Adanson intended only to differentiate the more or less rounded indusium of this genus from the more or less elongated, valve-like indusium of other genera. This appears to us improbable. Adanson had already, in the preceding column of his tabular arrangement, made the contrast between "longs" or "ovales" and "ronds" sori; it is not likely that he would immediately repeat it for the indusia. "En parasol," "like an umbrella," is actually paired with "en auvent," "like a pent-house" or shed—a vivid enough simile for a laterally attached indusium—and Adanson included under the latter heading a genus (his *Filix*) with sori described as round. That is, he was contrasting indusia opening on one side with indusia opening all around, without regard to shape.

It may be, and has been, better argued that Adanson, like other botanists of his time, had not perceived the distinction between peltate and reniform indusia—a difference apparently first pointed out by Roth in 1799. This is undoubtedly true. The fact remains, however, that in describing his mixture of indusial forms, he used a phrase which, if taken at all literally, can mean only peltate—as Davenport remarks, "no one has ever known a parasol to have its handle otherwise than in the center, or to have its rim divided"—and that the single species which he cited does not have such an indusium. It was largely because of this discrepancy that Davenport (Rhodora iv. 163 (1902)) rejected *Dryopteris* and was followed therein by the editors of the seventh edition of Gray's Manual. And at least one pteridologist, Dr. J. B. Kümmerle of Budapest, takes the matter so seriously, that he follows[3] Adanson's description in prefer-

[1] Incidentally, we cannot accept Nakai's argument that since a plurality of the species referred by Adanson in his herbarium to *Dryopteris* have reniform indusia, the name may properly be used for the group so characterised, under Art. 45 of the International Rules. The provision of that article that, when a genus is divided, the name should go with the group containing the larger number of species can hardly be intended to apply to unpublished determinations of herbarium specimens, unknown to anyone but the maker of them. It refers only to published references of species to given genera. On the basis of publication, *Dryopteris*, like *Thelypteris*, was originally a genus of one species.

[2] It will be noted that Nakai, otherwise in agreement, finds it natural enough.

[3] See, for instance, Ann. Mus. Nat. Hungar. xxiv. 90 (1926) and Magyar Tudományos Akademia Balkán-kutatásainek, iii. 206–207 (1926).

ence to his citation of a representative species, and applies the name *Dryopteris* to *Polystichum* of Christensen, retaining *Nephrodium* for *Dryopteris* of Christensen.

Yet when, at Brussels in 1910, Harms proposed to conserve in place of *Dryopteris* the name *Nephrodium* Richard (1801 and 1803) which had much longer and more extensive use (in such general and standard works as Hooker and Baker's *Synopsis Filicum* and Diels's masterly treatment in *Die Natürlichen Pflanzenfamilien*) his proposition was voted down and by inference, at least, the misbegotten name *Dryopteris* was not ruled out. The name *Thelypteris* did not enter into the discussion, but surely if, as the Brussels Congress ruled, the nomenclature of the *Pteridophyta* must begin with the *Species Plantarum*, 1753 (not with Christensen's *Index Filicum* in 1906), we are obliged to take up *Thelypteris* Schmidel. To have to resuscitate it, with the ultimate necessity of scores or hundreds of new combinations, is undoubtedly a misfortune; but is no greater misfortune than was the exhumation of the equally disused *Dryopteris* from "the dust of synonyms," with the resultant 500 new combinations of the *Index Filicum* alone.

To sum up: By refusing to conserve *Nephrodium*, the Brussels Congress left the field open to the operation of the rule of strict priority. The priority of *Thelypteris* over *Dryopteris* has not been effectively questioned. Its publication is not perfect in form (as might be expected in a work first published in 1742 and only revised in 1762), but it appears to us adequate, and it is careful and accurate in substance. The publication of *Dryopteris* is correct enough in form, but careless and inaccurate in substance, so much so that diversity in its use exists. At worst, *Thelypteris* has claims enough to weigh on the consciences of careful followers of the rules; if *Dryopteris* is to be retained, with a clear title, it must be conserved by a botanical congress.

EXPLANATION OF PLATE 179

Schmidel's analytical details of THELYPTERIS, from Schmidel, Icon. Pl. ed. 2, t. 13 (1762).

II. A STUDY OF THELYPTERIS PALUSTRIS

M. L. Fernald.

(Plate 180.)

In our current manuals the Marsh Fern, which has been passing variously as *Aspidium Thelypteris* (L.) Sw., *Dryopteris Thelypteris* (L.) Gray or *Thelypteris palustris* (Salisb.) Schott, is distinguished from its closest relatives by the forking veins of the segments or pinnules of the fertile pinnae. Thus, in Gray's *Manual* the species, as *Aspidium Thelypteris*, is distinguished in the key from *A. simulatum* Davenp. merely by "Fertile veins once forked" and in the fuller description emphasis is placed on "*veins forked*, bearing the . . . fruit dots near their middle; indusium minute, smooth and naked;"[1] similarly in Britton & Brown's *Illustrated Flora* we find *Dryopteris Thelypteris* keyed out by "Veins once or twice forked," with the illustration clearly showing this point and the fuller text saying "veins regularly once or twice forked; . . . indusia small, glabrous."[2]

The essential identity of these American accounts of the venation of the fertile segments and the descriptions in European floras is striking. For example, in such an authoritative European work as Moore's *Nature-Printed British Ferns* we find the genus *Lastrea* in Great Britain broken into two sections, *Lastrea* § *Dryopteris* and *Lastrea* § *Thelypteris*, the latter section including *L. Thelypteris* and characterized by "*Veins usually forked, both branches* (*anterior and posterior venules*) *fertile;*"[3] while Moore's print from a fertile pinna shows the forking veins highly developed in all the median segments. Similar descriptions and illustrations of the venation of the fertile segments are found in all other detailed accounts of the European plant and the European specimens at hand clearly show many of the lateral veins of the fertile segments or pinnules to be forked (fig. 1). In fact, an actual count of the lateral veins of the anterior half of typical median *fertile* segments from median pinnae give a range of variation in the European plant as follows: from 2 forking and 4 simple to 7 forking and 3 simple, with an average of 4 veins forking and 4½ simple.

In northeastern America, however, from Newfoundland across

[1] Robinson & Fernald, in Gray, Man. ed. 7: 41 (1908).
[2] Maxon in Britton & Brown, Ill. Fl. ed. 2, i. 18, fig. 38 (1913).
[3] Moore, Nat.-Pr. Brit. Ferns (Octavo), i. 163, t. xxix (1859).

southern Canada as far west as southeastern Manitoba and south across the northern states to Georgia, Tennessee and Oklahoma, it is difficult to find true fertile segments of our Marsh Fern with many forking veins. In sterile fronds the veins are mostly forking and so they are, also, in sterile segments (particularly the basal ones) of fertile fronds; but, when median and well-developed segments of median fertile pinnae of the plant of northeastern America are examined, it will be found that the veins of their anterior halves are usually all or nearly all quite simple (fig. 7). Actual count in more than 200 numbers examined shows a range as follows: from 0 forking veins and 4 to 8 simple ones up to 3 forking and 7 simple, with an average of ½ a vein forking and 6 simple.

This tendency of the fertile segments of the Marsh Fern of northeastern America to have few forking veins but more numerous simple ones, although overlooked by most modern botanists, was clearly recognized by those early students of our flora who were unembarrassed by a large number of European specimens and unprejudiced by the very uniform descriptions of the European plant. Thus, on the label of his specimen from Essex County, Massachusetts, William Oakes wrote, a full century ago, "the lowest pair of veins only is most commonly forked, frequently *one* of the lowest veins only is forked, often a pair and a half or *two* of the lowest pairs are forked." Again, the masterly American phytographer, John Torrey, working with New York specimens, correctly described them in his *Flora of the State of New York*, as having "veins mostly simple, sometimes forked;"[1] and the late Charles Faxon, a modest but unusually keen observer, drawing the plate[2] of *Aspidium Thelypteris* for Eaton's *Ferns of North America* and showing "the common form in New England," gave diagrams of the venation: the sterile pinna with most of the veins forked, the fertile pinna with them mostly unforked below the indusia. Lastly, on a Rhode Island sheet from Professor J. F. Collins, I find the following comment: "lower veins of pinnules *forked*, occasionally some others; but most of them simple." But, for the most part, the makers of modern descriptions of the plant of northeastern America have found the descriptions of the European plant more convenient to copy and the result is, that, by emphasis upon a character rarely found in the American

[1] Torr. Fl. N. Y. ii. 497 (1843).
[2] C. E. Faxon in Eaton, Ferns N. A. ii. t. 30 (1879).

plant, the real distinctions between our *Thelypteris palustris* and the endemic American *T. simulata* (Davenp.) Nieuwl. are rendered unnecessarily doubtful. The key-character now found in our manuals should be greatly modified and the following substitute is proposed:

T. PALUSTRIS. Lateral nerves of the segments of the *sterile* fronds mostly forked, of the fertile simple or forked: indusia glabrous or coarsely glandular-toothed or long-ciliate.

T. SIMULATA. Lateral veins of the segments of both sterile and fertile fronds simple: indusia minutely glandular-ciliate.

Although the plant of northeastern America has the venation of the fertile pinnae much simpler than in typical European material, we have in the extreme southeastern states and in Bermuda a plant with veins quite as generally forked as in the European. All the material I have seen from Louisiana, Florida and Bermuda has most of the veins of the fertile pinnae forked (fig. 5). This material shows a range of variation as follows: from 3 forking veins and 6 simple ones to 6 forking and 2 simple, with an average of 4 forking and 4 simple, an average not very unlike that of the European series. Some plants, with several forking fertile veins occur northward to southeastern Pennsylvania and occasional individuals from further north have a few fertile segments with numerous forking veins. But north of Louisiana and Florida the species certainly shows a general reduction in the number of forked veins. Typical segments of three of these plants, the European (fig. 1), the northeastern American (fig. 7) and the southeastern American (fig. 5) are shown in the outline drawings prepared by Miss Ethel C. Dansie.

The descriptions of the indusia in American manuals and in European handbooks are so different that, coupled with the difference in venation already discussed, they might very naturally be taken as characterizing distinct European and northeastern American species. The statements in Gray's *Manual* and in Britton & Brown's *Illustrated Flora* have already been quoted: "indusium minute, smooth and naked" and "indusia small, glabrous." Such characterizations are typical in America; and when we turn to European descriptions and illustrations we likewise find a remarkable uniformity of statement, but one seemingly incompatible with the American. Thus, the analytical drawings published by Schmidel[1] (see PL. 179) with his original account of *Thelypteris* show the indusia with coarse gland-tipped teeth; and in his description Schmidel strongly emphazised

[1] Schmidel, Icones Plantarum, ed. 2, t. xiii (1762).

them: "Quandiu peltae iuniores et vegetae adhuc sunt, apicibus lacinularum, non quidem omnium in omnibus, plurimarum tamen, inhaerere solent globuli parui, crocei dilutioris coloris, propter succum quem continent viscidulum splendidi. Ex his vnus post alterum sensim euanescunt, postquam ad aliquod tempus durauerunt." Similarly, in the very clear analytical plate in his incomparable *Kryptogamische Gewächse*, Christian Schkuhr showed the characteristic European plant with practically all the fertile veins forking and with the indusia bearing conspicuous glands at the tips of the coarse teeth: "Die Fruchtdecken . . . sind am Rande mit gestielten Drüsen besetzt."[1] Or, again, in Moore's *Nature-Printed British Ferns*, already referred to, the illustration brings out the glandular ciliation and the text emphasizes it: "*Indusium* a small delicate roundish-reniform membrane, . . . the free margin lacerate and glandular"; and Luerssen goes still farther, describing not only the gland-tipped teeth, but also glands between the teeth and longer unicellular hairs occurring irregularly on the indusia.[2] When the young and unshrivelled indusia of the European plant (fig. 2) are examined they are found to agree perfectly with the best European descriptions, in having coarse teeth tipped by conspicuous yellow or orange glands and only rarely (in a single collection seen by me, of *Dryopteris Thelypteris*, forma *Rogaetziana* (Bolle) Holmberg) do they have the very long cilia described by Luerssen. This European type, with fertile veins mostly forking and with indusia with coarse gland-tipped teeth, extends southward to the Mediterranean and eastward to India and southern China.

In the plant of northeastern America, on the other hand, the indusia (fig. 8) are mostly larger than in the European type (the best-developed measuring 0.7-1 mm. in diameter) and less lacerate or long-toothed. Only rarely are they so glandular-ciliate, occasionally they have a few glands, but the great majority of them examined (from a series of fully 200 numbers) are either quite glabrous and without ciliation or glabrous on the back and ciliate with few to many long slender trichomes. It is clear, then, that, although strikingly similar in aspect to European *Thelypteris palustris*, the

[1] Schkuhr, Krypt. Gew. 52, t. 52 (1809).

[2] "am Rande unregelmässig kurz-lappig bis stumpf-zähnig und auf der Spitze der Lappen oder Zähne sowie auch zwischen denselben mit kurzen, cylindrisch-keuligen bis keulenförmigen drüsigen Härchen und dazwischen längeren pfriemenförmigen, einzelligen Haaren in sehr wechselndem Verhältniss besetzt."—Luerrsen, Farnpfl. 364 (1889).

plant of northeastern America differs from it in having the veins of the fertile pinnae usually simpler and the larger indusia rarely so glandular-ciliate but more often glabrous or long-ciliate and without conspicuous glands. In one other tendency does it show a strong departure: in commonly having the rachis (at least when young), the midribs of the pinnae and the veins (especially beneath) minutely and rather densely pubescent, the frond of the European plant being nearly or quite glabrous. The pubescence is not always conspicuous in our plant but in nine-tenths of our material it is well developed and the plant of northeastern America is obviously what was intended by the late George Lawson when he designated "the plant of Gray's Manual" as

"*Lastrea Thelypteris*, α. *pubescens*.—Frond somewhat coriaceous, densely pubescent or downy throughout."[1]

And naturally enough, though like all other such cases coming as a fresh surprise, when the venation of the fertile fronds (fig. 9) and the characters of the indusia (fig. 10) of all available material from northeastern Asia (5 collections from Manchuria and Amur) are examined, they show that the plant of Amur and Manchuria is indistinguishable from that of northeastern America. It is, furthermore, noteworthy that Christensen, studying the ferns brought back from Kamtchatka by Hultén, should have set off as "a most striking variety" the plant of South Kamtchatka: *Dryopteris Thelypteris*, "var. **kamtschatica** C. CHR. nov. var. . . . Frons longe stipitata rigida, lamina utrinque pubescente subtus squamis et glandulis destituta,"[2] with the additional comment "indusia rather large and persistent." Christensen's *D. Thelypteris*, var. *kamtschatica*, like the plant of Amur and Manchuria, is pretty clearly the same as *Lastrea Thelypteris*, var. *pubescens* Lawson. Var. *kamtschatica*, besides its pubescent and esquamose and glandless character was "especially marked by . . . , short blade; frequently the stipe is 30 cm. or more, the lamina [fertile] 10 cm. long and only 5-6 cm. wide"

[1] Lawson, Edinb. New Phil. Journ. n. s. xix. 277 (1864)—Reprinted as Syn. Can. Ferns and Fil. Pl. 21 (1864). Lawson's plant came from "Odessa, Hudson's Bay, & c." This does not mean that the fern reaches northward to Hudson Bay, as might naturally be inferred. Hudson's Bay Territories in Lawson's day embraced all the vast unincorporated and undeveloped area now called Canada from the Atlantic to the Pacific and north of the St. Lawrence and the Great Lakes. It even included "the neighborhood of Montreal, up the Ottawa River," etc. (Lippincott's Gazetteer). The Odessa of Lawson, which may be taken as the type-station, is slightly north of latitude 44° N. in Addington Co., Ontario. His "Hudson's Bay" might have been anywhere in southeastern Ontario or southwestern Quebec.

[2] Christens. in Hultén, Fl. Kamtch. and Adj. Isl. i. 38 (1927).

and it was found only in "alkaline?" soil near a hot spring. In the plant of northeastern America it is not difficult to find stipes up to 7 dm. in length and in many plants the fertile lamina is but slightly more than one-third the length of the stipe. In fact, such a collection as *Bissell & Linder*, no. 19,402 from "brackish marsh," George River, Nova Scotia, must be a very close match for the type of var. *kamtschatica;* the George River specimen preserved in the Gray Herbarium having two fertile fronds: one with stipe 37 cm. long and lamina 13 cm. long and 7.5 cm. broad, the other with the lamina 15 cm. long and 6 cm. broad.

From Christensen's observation upon the Kamtchatkan plant, above quoted, one would infer that the proportions of stipe and lamina in the eastern Asiatic and the European plants are notably different. Without a larger and better-collected representation than I have seen from Europe I am unable to say whether the northeastern American and the European plants actually differ in these points. Lawson (l. c.) said: "In the Canadian plant the outline of the frond is a little different from Scotch and Irish specimens, being less narrowed at base." The European works, to quote from Moore's detailed account again, describe the "*Stipes* as long as or longer than the leafy portion in the fertile fronds. . . . Fronds . . from four to ten inches in breadth," and the European representation before me shows the fertile lamina ranging from 0.7 to 2 dm. in width (Moore's "ten inches" would be 2.45 dm.), with stipes up to 5 dm. long. In the plant of northeastern America the stipes often reach a length of 7 dm. (probably not really different in Europe) and the fertile laminas of the more than 200 numbers before me give a range in breadth of 0.4 to 1.7 dm. (with two collections from rich calcareous meadows showing the extraordinary breadth of 1.9 dm. and 2.1 dm. respectively), the average breadth of the 200 + laminas being 10.7 dm. Whether this average is less than in Europe I cannot say; judging from European descriptions and illustrations, apparently it is.

When we turn to the plant of the southeastern United States and Bermuda, with venation (fig. 5) as in the typical *Thelypteris palustris* of Europe and western and south-central Asia, we find an indusium (fig. 6) essentially like that of the northeastern American and northeastern Asiatic *Lastrea Thelypteris*, var. *pubescens* of Lawson, with few, if any, glands but with elongate non-glandular ciliation and in

size practically like the European indusia. This southern plant, it would seem, is as closely related to the more northern American extreme as it is to the European; and in the usual abundance of long cilia on the indusia they both strongly suggest the still more austral *T. palustris*, var. *squamigera* (Schlecht.) Weatherby[1] of southern India, tropical and southern Africa and northern New Zealand. In var. *squamigera* (fig. 3) there is a greater development of broad brown scales on the lower side of the costa of the pinna than is common in the more northern plants; but small (though narrower) scales may be found on young and carefully preserved European and American specimens, and in the plants of Louisiana and Bermuda they are as abundant and nearly as broad as in African specimens. The plant of southeastern North America, however, can scarcely be referred to var. *squamigera*. Such material of the African and New Zealand plant as I have examined (only three or four of the sheets showing young indusia) has the indusia (fig. 4) with copious dorsal as well as marginal long trichomes; the southeastern American plants having the indusia essentially glabrous on the back and the frond more definitely bipinnate than in the other varieties.

Thelypteris palustris, a semi-cosmopolitan species, has, then, four strongly marked varieties which may be distinguished as follows.

T. PALUSTRIS (Salisb.) Schott, var. **typica**. *Acrostichum Thelypteris* L. Sp. Pl. ii. 1071 (1753). *Polypodium Thelypteris* (L.) Weis, Pl. Crit. Fl. Gott. 307 (1770). *P. palustre* Salisb. Prodr. 403 (1796). *Polystichum Thelypteris* (L.) Roth in Roem. Arch. ii. pt. 2: 106 (1799). *Aspidium Thelypteris* (L.) Sw. in Schrad. Journ. 1880, pt. 2: 33 (1801). *Athyrium Thelypteris* (L.) Spreng. Anleit. iii. 134 (1804). *Aspid. palustre* (Salisb.) S. F. Gray, Nat. Arr. Brit. Pl. ii. 9 (1821). *Nephrodium Thelypteris* (L.) Strempel, Fil. Berol. Synop. 32 (1822). *Lastrea Thelypteris* (L.) Bory, Dict. Class. ix. 233 (1826). *T. palustris* (Salisb.) Schott, Gen. Fil. in Obs. under t. 10 (1834). *Aspid Thelyptera* Wood, Class-Book, 459 (1845) as to name-bringing syn. *Dryopteris Thelypteris* (L.) Gray, Man. 630 (1848), as to name-bringing synonym. *Hemestheum Thelypteris* (L.) Newm., Phytol. iv. Append. xxii (1851). *Lastrea palustris* (Salisb.) J. Sm. Cat. Cult. Ferns, 56 (1857). *T. Thelypteris* (L.) Nieuwl. Am. Midl. Nat. i. 226 (1910), as to name-bringing synonym.—Fertile lamina 0.7–2.5 dm. wide, glabrous or only sparingly pubescent: scales on back of rachis and midribs lanceolate to oblong, caducous: segments of median fertile pinnae with about half the veins forking (of those of the anterior half 2–7 forking, 3 or 4 simple): indusia with coarse gland-tipped

[1] Weatherby in Johnston, Contrib. Gray Herb. no. lxxiii. 40 (1924).

teeth, only rarely with long glandular ciliation.—Great Britain, southern Norway, central Sweden, northern European Russia (Perm) and lat. about 58° in western Siberia eastward in Asia and south to northern Spain, Algiers, central Italy, the Caucasus, the Himalayas and southern China. FIGS. 1 and 2.

Var. SQUAMIGERA (Schlecht.) Weatherby in Johnston, Contrib. Gray Herb. lxxii. 40 (1924). *Aspidium Thelypteris*, β. *squamigerum* Schlecht. Adumb. 23, t. 11 (1825). *A. squamulosum* Kaulf. ex Schlecht, l. c., in syn. (1825). *Lastrea squamulosa* Presl, Tent. 76 (1836). *Nephrodium squamulosum* (Presl.) Hook. f. Fl. N. Zeal. ii. 39 (1855). *A. Thelypteris*, β. *squamuligerum* Mett. Abh. Senckenb. Naturf. Ges. ii. 112 (1855). *N. Thelypteris*, β. *squamulosum* (Presl) Hook. Sp. Fil. iv. 88 (1862). *Lastrea Fairbankii* Bedd. Ferns Brit. Ind. t. 254 (1867). *N. Thelypteris*, var. β. *squamuligerum* (Mett.) Sim, Ferns S. Afr. 180 (1892). *Dryopteris Thelypteris*, var. β. *squamuligera* [as *um*] Sim, l. c. ed. 2: 102 (1915).—Fertile lamina 0.5–1.5 dm. wide; scales of rachis and midribs reniform, suborbicular or broad-ovate, castaneous or fulvous, rather persistent: veins of median fertile pinnae mostly simple: indusia copiously long-ciliate and commonly with shorter glandular ciliation and often pilose-hirsute on the back.—India, tropical and southern Africa, northern New Zealand. FIGS. 3 and 4.

Var. **Haleana**, n. var., frondibus plerumque bipinnatis medio 0.8-2 dm. latis; pinnarum costa media squamis paleaceis obtecta, squamis ovatis obtusis castaneis vel fulvis persistentibus vel caducis, pinnularum fructiferum nerviis plerumque furcatis; indusio longe ciliato vix glanduloso.—Southeastern United States and Bermuda Islands. LOUISIANA: marshes, Alexandria, *Josiah Hale* (TYPE in Gray Herb.). FLORIDA: Palma Sola, *S. M. Tracy*, no. 6627; Deep Lake, Lee Co., *A. A. Eaton*, no. 1312; Miami, May, 1877, *A. P. Garber* (as *Aspidium unitum*); Black Point, Dade Co., *A. A. Eaton*, no. 277; Alapattah, *A. A. Eaton*, no. 1007; Biscayne Bay, *E. Palmer*, no. 652; New Smyrna, *Palmer*. BERMUDA: Pembroke Marshes, June 21, 1905, *Harshberger*, August 23, 1913, *F. S. Collins*, no. 122; Devonshire Marshes, *Brown & Britton*, no. 84. Specimens from Georgia, eastern Virginia and southeastern Pennsylvania show more simple veins and seem to indicate transition to the next. FIGS. 5 and 6.

Var. **pubescens** (Lawson), n. comb. *Lastrea Thelypteris*, α. *pubescens* Lawson, Edinb. New Phil. Journ. n. s. xix. 277—reprinted as Syn. Can. Ferns and Filic. Pl. 21 (1864). Lawson's *L. Thelypteris*, β. *glabra* likewise belongs here, but his γ. *intermedia* (judging from the locality) may be different. *Dryopteris Thelypteris*, var. *kamtschatica* C. Chr. in Hultén, Fl. Kamtch. and Adj. Isl. i. 38 (1927).—Fronds usually minutely pubescent, at least when young, on both surfaces and especially along the rachis and lower sides of the midribs, mostly without scales or when young with pale narrow caducous scales; fertile fronds 0.4–1.7 (rarely– 2.1) dm. broad; the median fertile

segments with the veins all or nearly all simple: indusia when well developed 0.7–1 mm. in diameter, glabrous or long-ciliate, rarely glandular-ciliate.—Southeastern Newfoundland and the Magdalen Islands to the Ottawa Valley, Quebec, west to southeastern Manitoba and south to Georgia, Tennessee and Oklahoma (and Texas ?); southern Kamtchatka, Amur and Manchuria. TYPE-STATION: Odessa, Addington Co., Ontario (*Lawson*). FIGS. 7–10.

Phylogenetically the typical Eurasian plant, *Thelypteris palustris*, var. *typica*, seems to be farthest removed from the other varieties, in having the indusium more glandular-toothed but less often with long glandless ciliation than in the other three varieties. In this connection it is noteworthy that the European plant is distinctly not a boreal fern, there reaching its northern limit in Perm, central Sweden, southernmost Norway[1] and Great Britain and Ireland, where, in the northern and western districts it is sufficiently local to have led Moore (in 1859) to write: "Though widely dispersed in the United Kingdom, the Marsh Fern is a comparatively rare plant, being local in occurrence . . . The only Scottish county in which there is certain information of its occurrence is Forfarshire; and the recorded habitats in Ireland are few."[2] Other localities are now known, but the main point is clear, that in Europe the species is not primarily a boreal one. In Asia too, its northwestern limit (acc. to Christensen in Hultén) is near Tobolsk, and southward it reaches Algeria, central Italy, Crimea, the Caucasus, southern Turkestan, the Himalayas and southern China. In brief, var. *typica* belongs to temperate Eurasia.

Similarly, var. *pubescens*, the almost ubiquitous Marsh Fern of eastern America, is not boreal, reaching its northern limits near the southern borders of eastern Canada and Newfoundland but extending south into the Southern States; while var. *Haleana* is in a warm-temperate to sub-tropical belt, its northernmost extension on the Bermudas, its southernmost on the Florida Keys. The other variety, var. *squamigera*, occurs in southern India, tropical and southern Africa and on the North Island of New Zealand. In all three of these varieties, the plants of tropical, subtropical and temperate regions of the Southern Hemisphere and of eastern America and northeastern Asia, the preponderance of long glandless ciliation over short glandularity of the indusia is striking and it seems probable that the original form of the species was a plant of tropical or sub-

[1] Holmb. Hartm. Handb. Skand. Fl. revised by Holmb. i. 11 (1922).
[2] Moore, Nat.-Pr. Brit. Ferns (Octavo) i. 167, 168 (1859).

tropical regions, such as vars. *squamigera* and *Haleana* and that the more northern var. *pubescens* and still more extreme var. *typica* have been of later origin.

Explanation of Plate 180

Varieties of Thelypteris palustris; outlines and venations of pinnae × 1½, outlines of indusia × 50. Figs. 1 and 2, var. typica; fig. 1 from Sweden, coll. *Hugo Granvik*, fig. 2 from Bavaria, *Reinsch*, no. 398. Figs. 3 and 4, var. squamigera, both from Natal, coll. *S. L. Abraham*, 1865–6. Figs. 5 and 6, var. Haleana, both from the type, Alexandria, Louisiana, *J. Hale*. Figs. 7–10, var. pubescens; fig. 7 from Shelburne, New Hampshire. coll. *W. Deane*, August 19, 1915, fig. 8 from Stottville, Quebec, coll. *G. G. Kennedy*, July 23, 1863, figs. 9 and 10 from Amur, coll. *S. Korshinsky*, 1891.

(To be continued)

A New Form of Erythronium americanum.—While collecting in some swampy woods in the southeast corner of Rockport Township, Massachusetts, I found a large patch of *Erythronium americanum* much of which was the typical plant. However, many of the plants had flowers rather smaller than the average and with the inner part of the perianth a deep chestnut-brown. This plant may be designated as follows:

Erythronium americanum Ker., forma **castaneum**, forma nov., perianthio minore, intus atro-castaneo.—Swampy woods, Rockport, Massachusetts, *L. B. Smith* 938.—Lyman B. Smith, Winchester, Mass.

Aquilegia canadensis, forma Phippenii in Worcester County, Massachusetts.—On May 1, 1925, while specimen hunting at Boylston, Worcester County, Massachusetts, I found in a pasture, on a shale outcrop with the common scarlet-flowered form of wild columbine, a delicate salmon-pink form, fresh flowers of which were this year sent to the Gray Herbarium and were there identified by Mr. C. A. Weatherby as *Aquilegia canadensis*, f. *Phippenii* (J. Robinson) R. Hoffman. Indications are that the station will endure many years.—Earl W. Bemis, Worcester, Massachusetts.

TWO NEW PLANTS FROM ILLINOIS.

Paul C. Standley.

In a collection of plants made in Richland County, Illinois, in the summer of 1928 by Robert Ridgway, and received recently at

Field Museum for determination, there are represented the two plants which are described below. One of these is a race of the common southern yellow pondlily, which is, apparently, only a variant from the typical form. The other plant, however, is of considerable interest, since it appears to represent a clear case of hybridization in the genus *Liatris*, a group of Compositae in which hybridization has been suggested previously, although not in the case of either of the species here concerned.

NUPHAR ADVENA Ait., var. **brevifolia** Standl., var. nov.—Folia erecta, petiolo subtereti, 6–10 mm. crasso; limbus late rotundato-ovatus, 10–11.5 cm. longus, 8.5–9 cm. latus, apice rotundatus, basi profunde cordatus, sinu lato, aperto, 4 cm. longo, lobis obtusis; flores 3.5 cm. lati.—ILLINOIS: Near mouth of Big Creek, Richland County, Sept. 9, 1928, *Robert Ridgway 3351* (Herb. Field Mus. No. 579881, TYPE).

This plant represents a fairly well-marked variety or form of the yellow pondlily of southern Illinois. The leaves, although exactly like those of typical *Nuphar advena* in outline, are much smaller than in any specimens which I have seen previously, and the flowers, also, are somewhat reduced. Of the plant Mr. Ridgway writes: "This seems to me different from *N. advena*. It is abundant here, usually growing quite apart from *N. advena*. It may possibly be an ecological form of the common species, but it is so much smaller in all its parts that I can hardly believe that it is not specifically distinct."

Although under the International Rules the generic name *Nymphozanthus* has technical priority, the writer prefers to use the more usual name, *Nuphar*, for this genus, with the expectation that the latter will be conserved by the next international congress.

× **Liatris Ridgwayi** [*L. pycnostachya* Michx. × *L. squarrosa* (L.) Willd.] Standl., hybr. nov.—Caulis erectus, simplex, dense foliatus, striatus, molliter pilosus; folia sessilia (inferiora non visa), linearia, adscendentia, superne longitudine sensim decrescentia, 4.5–13.5 cm. longa, 2–5 mm. lata, versus apicem sensim attenuata, crassa, punctata, 1–3-nervia, utrinque praecipue ad nervos pilosa; capitula c. 18-flora, sessilia, spicata, spica 19 cm. longa, 3 cm. lata, subdensa, bracteis foliis conformibus, divaricatis, capitula aequantibus vel multo superantibus; involucrum cylindrico-campanulatum, 12–14 mm. longum, 7–11 mm. latum, squamis exterioribus lanceolato-oblongis, acuminatis, fere omnino viridibus vel superne purpureis, pilosis et longiciliatis, apicibus subsquarrosis, squamis interioribus oblongis, adpressis, acutis vel acuminatis, fere glabris, parte apicali purpurea, recurvata; corollae purpureae, glabrae, tubo gracili, 10 mm. longo,

superne paullo ampliato, lobis 2–3 mm. longis; achaenia 3.5 mm. longa, olivacea, hirtella, pappi setis 9 mm. longis, breviter plumosis.—ILLINOIS: East of Bethel Church, Richland Co., Aug. 26, 1928, *Robert Ridgway 3265* (Herb. Field Mus. No. 579880, TYPE).

The type material of *Liatris Ridgwayi*, consisting of the upper portion of a flowering plant, was found growing with plants of *L. pycnostachya* and *L. squarrosa*, and there is little doubt in the writer's mind that it represents a hybrid between them. In characters it is intermediate between these two species, but in general appearance it resembles more closely *L. pycnostachya*. The spikes are less dense and have fewer heads than those of that species. The long bracts occurring in the upper part of the spike, the large heads, and the green squarrose outer phyllaries all suggest *L. squarrosa*, and the terminal head of the spike is very similar to a head of that species, except for its smaller size. The heads, of course, have more numerous florets than in *L. pycnostachya*, and the pappus is about intermediate between the barbellate pappus of *L. pycnostachya* and the plumose pappus of *L. squarrosa*.

FIELD MUSEUM OF NATURAL HISTORY.

A HYBRID RYNCHOSPORA.—On August 18, 1927, Mr. J. M. Fogg, Jr. and I explored the region of Great Pond in Wellfleet, Massachusetts. In one boggy swale where both *Rynchospora alba* (L.) Vahl and *R. capitellata* (Michx.) Vahl abounded we found several clumps of a plant exactly intermediate between those two common species. Combining their characters and being quite sterile, it is an obvious hybrid of them which is worthy special record, since hybrids in the genus are very rare. The essential data are:

RYNCHOSPORA **alba** × **capitellata**, n. hybr. With the habit of *R. alba*, the glomerules obpyramidal, subtruncate at top, brown but hardly castaneous (as in *R. capitellata*); achenes shrunken and poorly developed.—MASSACHUSETTS: with the parents, boggy swale by Great Pond, Wellfleet, August 19, 1927, *Fernald & Fogg*, no. 554 (TYPE in Gray Herbarium).—M. L. FERNALD, Gray Herbarium.

MOSS FLORA OF NORTH AMERICA.—The first part of a new moss flora[1] has appeared. It includes the subfamilies *Climacieae*, *Porotricheae* and *Brachythecieae* of the *Hypnaceae*, all groups in which Dr.

[1] **MOSS FLORA OF NORTH AMERICA, NORTH OF MEXICO, by A. J. Grout, Ph. D., Vol. 3, Pt. 1. Published by the author, 1 Vine St., New Brighton, Staten Island, New York City. Sept., 1928. Pp. 1–62. Pls. 1–14. Price $2.50.**

Grout has been specially interested for years. It is announced that other parts will follow "when and if a sufficient number of subscriptions is obtained to warrant" the expense. This first part is an attractive pamphlet measuring about 8 x 10½ inches and comprising 62 pages and 14 full page plates. The latter are mainly excellent selected reproductions from such standard authorities as Bruch & Schimper's Bryologia Europaea, Sullivant's Icones Muscorum, and Hooker's Musci Exotici.

The reviewer has had some experience in constructing taxonomic keys for various groups of plants, consequently he probably has scrutinized the keys in the Moss Flora more critically than some other parts. In general they seem to be both adequate and clear, but there are a few exceptions to this statement; e. g., on page 30 under 25 of the key we see "Plants slender" contrasted with "Plants robust." To one more or less familiar with the plants of this genus (*Brachythecium*) this would probably offer no obstacle, but to one who was not familiar with mosses almost any isolated plant of this genus might appear slender when contrasted with plants with which he was already familiar. Again, the reviewer will have to confess that he would have difficulty with number 28 on the same page. It would seem to him that "Leaves decurrent, strongly serrate above" contrasted with "Leaves not (or but slightly) decurrent, denticulate all around" would have been clearer and more definite than what appears in the key.

The simple and detailed description of each species is preceded by the more important synonymy and followed by a statement of the type locality, habitat, range, and a rather full index of previously published illustrations and exsiccati. All this is followed by what the reviewer considers a most excellent feature: viz., a statement of just how the particular species can most readily be separated from its nearest relatives—a feature that is characteristic of Dixon & Jameson's familiar "Handbook of British Mosses."

Dr. Grout has decided that those species of *Brachythecium* with erect symmetric cylindric capsules which lack cilia between the teeth of the peristome should be separated as a distinct genus. It will be a satisfaction to readers of RHODORA, as well as to all bryologists, to learn that this new genus has been named *Chamberlainia*, in honor of the late Edward B. Chamberlain.

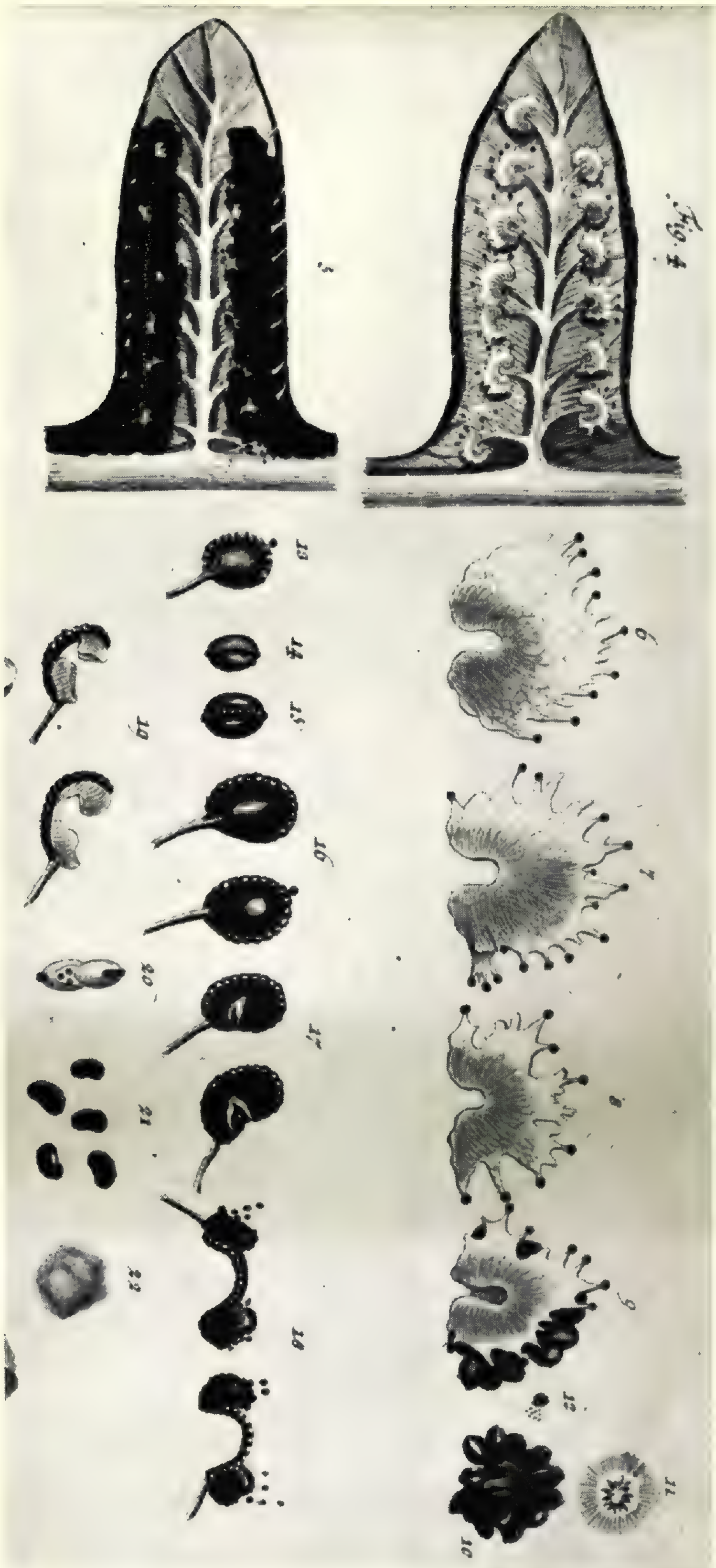
It is hoped that the remaining parts of the Moss Flora can be completed within a reasonable time and thus give us a much needed successor to the Lesquereux & James manual of 45 years ago.—J. FRANKLIN COLLINS.

A SECOND STATION FOR PANICUM LONGIFOLIUM IN MASSACHUSETTS. —In RHODORA for September[1] Professor Fernald records the finding

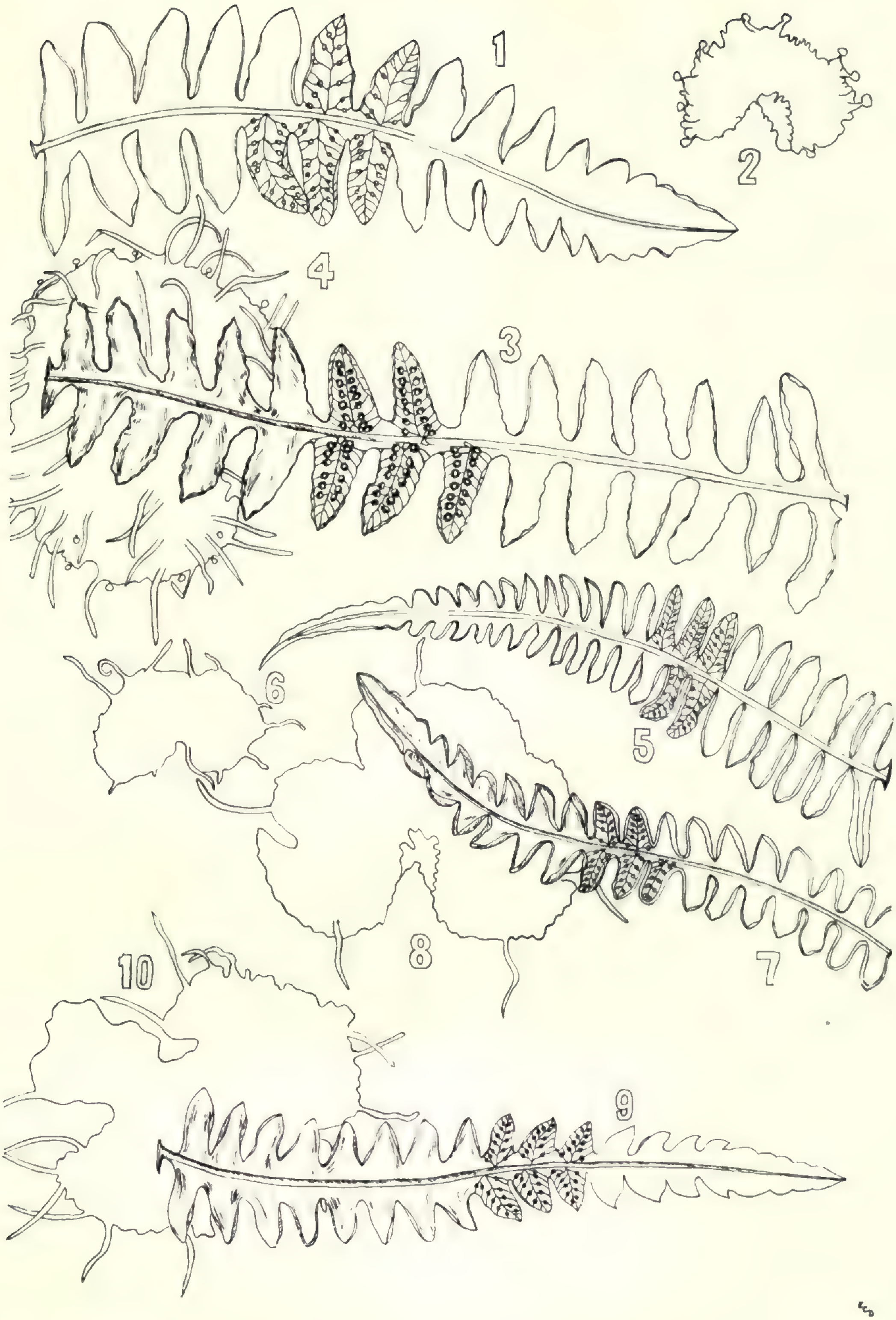
[1] See Fernald, RHODORA, XXX. 190 (1928).

in the township of Marion, Plymouth Co., Massachusetts, on August 9, of *Panicum longifolium* Torr., a coastal plain species, hitherto unknown from Massachusetts. On August 28, 1928, the writer, together with Mr. Paul W. Bowman, made a collecting trip to Pasque Island, Dukes Co., Massachusetts. This island, like the other Elizabeth Islands, of which chain it is a member, presents a great number of peaty and boggy depressions among barren, morainal hills. In such a hollow, at the east end of the island, *P. longifolium* was found growing in profusion. Its occurrence here apparently constitutes the second station for this grass in the state. Specimens are being deposited in the herbaria of the New England Botanical Club, the University of Pennsylvania and the Marine Biological Laboratory, Woods Hole.—John M. Fogg, Jr., University of Pennsylvania.

Vol. 31, no. 361, including pages 1 to 20 and plates 177 and 178, was issued 31 January, 1929.



SCHMIDEL'S DETAILS OF THELYPTERIS



E. C. Dansie del.

VARIETIES OF THELYPTERIS PALUSTRIS

FIGS. 1 and 2, var. TYPICA; 3 and 4, var. SQUAMIGERA; 5 and 6, var. HALEANA; 7–10, var. PUBESCENS.

Farlow Bot. Lab
MAR 11 1929

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INDEX TO THE FLORA OF THE BOSTON DISTRICT.

C. H. Knowlton.

The project of a Local Flora of the Boston District was first taken up by the New England Botanical Club in 1906, and a committee was appointed to collect data and commence the publication of such a flora. Lists of herbaria and previous floras were brought together and after much discussion the form of the reports was settled, and records were collated so that the first report was published in May, 1907, the committee then consisting of Messrs. A. K. Harrison, F. F. Forbes, C. H. Knowlton, and R. A. Ware. Messrs. J. A. Cushman, S. F. Blake and Walter Deane later served as members, the committee finally dropping down to two members in 1914, Messrs. Knowlton and Deane. The technique was so well established by that time that these two completed the work, the last publication coming in August, 1924. The reports are thus scattered through many volumes of Rhodora, forming a total of about 215 pages. It has seemed that an index would be of considerable value to those who have occasion to refer to this flora.

The first reports came before the publication of the seventh edition of Gray's Manual, so the committee purposely skipped from the Gymnosperms to Liliaceae and the following families, returning to the more difficult orders of the Monocotyledons after the publication of the Manual. This is the only deviation from the Manual order. At first the genera also were arranged in Manual order but beginning with the Dicotyledons it seemed easier to follow an alphabetical arrangement for genera and species.

The district covered follows the Massachusetts-New Hampshire state line west to include Groton, thence south, including Ayer, along the Worcester County line, including Southboro, to Bellingham on

the Rhode Island line; thence east, including all of Norfolk County, Easton and the Bridgewaters, to Duxbury on the coast. This is a fairly good geographic unit, but it was a long time before adequate data from the southern towns were available. From this area were reported 2030 species, 322 varieties, 45 forms, and 54 hybrids. Of these 788 species, 62 varieties and 4 forms were plants of foreign origin, thus leaving a native flora of 1242 species, 260 varieties and 41 forms.

The introduced plants were identified with great care, and notes on their origin were given when possible. Many of these were brought in wool from the ends of the earth, and were collected by those indefatigable observers, Miss Emily Fletcher and Rev. W. P. Alcott.

There have been numerous changes in nomenclature since the list was started, and of course occasional errors have come to light. Thus *Thalictrum dasycarpum* Fisch. & Lall., Rhodora XVIII, 168, proves to be based on a specimen of the *T. polygamum* group. *Aster polyphyllus* Willd. in Rhodora XXVI, 58, was based on large specimens of the *A. ericoides* complex.

Special credit should be given to Professor A. K. Harrison for his initial help in starting the project, and to Mr. Walter Deane, whose previous experience with the Metropolitan Park Flora proved invaluable and whose kindly hospitality to the committee did much to make the completion of the task possible. The staff of the Gray Herbarium, especially Professor M. L. Fernald, have coöperated at every stage of the work, and much help was received from Dr. B. L. Robinson as editor of Rhodora.

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Hingham, Massachusetts

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. LXXXIII.

(*Continued from page 36.*)

III. FOUR GRASSES OF EASTERN AMERICA

M. L. Fernald

Poa **labradorica**, n. sp., perennis rhizomate repente; foliis imis marcescentibus subcoriaceis rosulatis, vaginis subinflatis chartaceis valde carinatis circa 14-costatis 1.5–4 cm. longis, ligulis brevissimis truncatis, laminis 0.5–1.5 dm. longis 3–6 mm. latis subrigidis valde plicatis vel convolutis apice subulatis; foliis caulinis 2–4 remotis, lamina suprema falcata subrigida subacerosa 4–7 cm. longa, ligulis chartaceis 2.5 mm. longis; culmo solitario stricto tereti 1.5–4 dm. alto glabro crasso ad basin 2.5–4 mm. diametro; panicula stricta 6–12 cm. longa 0.7–2 cm. diametro ramis coarctatis glabris; spiculis ellipticis purpurascentibus vel stramineis valde compressis 5.5–9 mm. longis 2–3-floris; glumis coriaceis valde carinatis glabris ovato-lanceolatis acuminatis margine apiceque albido-hyalinis, gluma inferiore 4.5–5.5 mm. longa, superiore 5–7.5 mm. longa; rhachilla deinde elongata flexuosa glabra; lemmatibus lanceolatis 4–5 mm. longis 5–7-nerviis supra glabris basin versus pilosis apice late hyalinis deinde erosis vel fimbriatis; palea lineari-lanceolata bicarinata, carinis scabris, apice bifida; antheris linearibus 2 mm. longis.—East coast of Labrador: Nain, August 11, 1897, *J. D. Sornborger*, no. 239, distributed as *P. eminens* (type in Gray Herb.); Bowdoin Harbor, July 25–August 4, 1927, *C. S. Sewall*, no. 111; Jack Lane's Bay, July, 1927, *Sewall*, no. 201; Anatolak, June–August, 1928, *Sewall*, nos. 426, 428.

The type of *Poa labradorica*, long separated off in the herbarium as a distinct species, is now reinforced by the four collections made by Mr. Sewall in the same general region, the area centering on Nain. These form a thoroughly consistent series, clearly distinct from *P. eminens* Presl in many characters. The latter is a very glaucous plant, with much broader and flat whitish leaves (up to 1.5 cm. broad) and stouter (up to 9 mm. thick) culms, the uppermost cauline leaf with blade 1–3 dm. long; *P. labradorica* being scarcely if at all glaucous, with strongly convolute green leaves 3–6 mm. wide, with culms at most 4 mm. thick and with the blade of the uppermost leaf only 4–7 cm. long. In *P. eminens* the dense or lax panicles are 0.8–3.3 dm. long, 2–10 cm. in diameter, in *P. labradorica* 6–12 cm. long and only 0.7–2 cm. thick. In *P. eminens* the spikelets are large, 3–5-flowered, with the ovate glumes up to 11 mm. long and scabrous on the keel, the ovate lemmas scabrous to or essentially to the tip;

in *P. labradorica*, with 2–3-flowered spikelets, the more lanceolate glumes glabrous throughout and at most 7.5 mm. long, the much narrower lemmas glabrous except at the pilose base.

Although Scribner & Merrill have proposed *Poa Trinii* Scrib. & Merr., Contrib. U. S. Nat. Herb. xiii. 73 (1910) as a second species related to *P. eminens*, it is clear that *P. labradorica* cannot be referred to *P. Trinii*. In fact, I am quite unable to separate the latter from *P. eminens*. The characters used by Scribner & Merrill are not

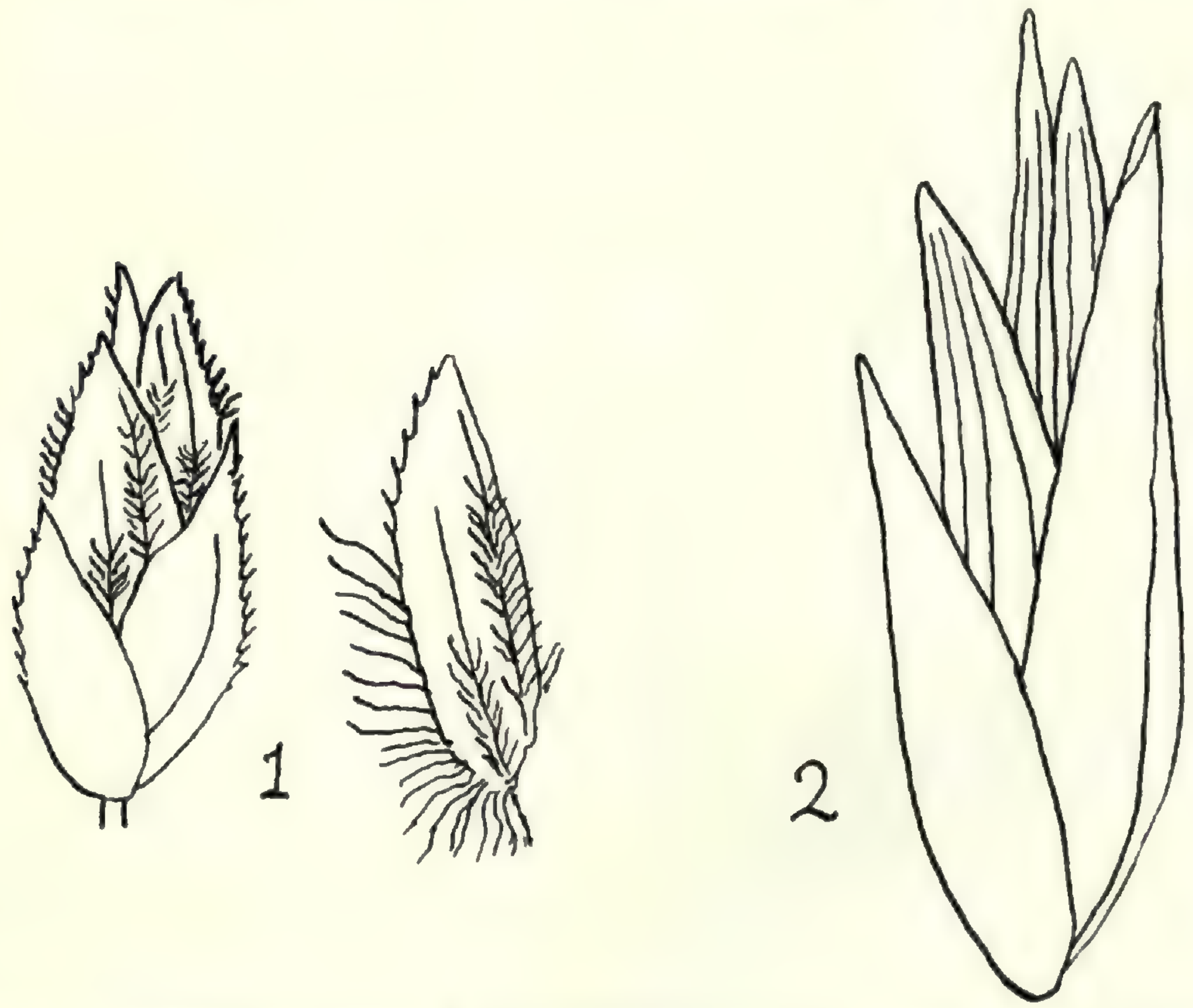

FIG. 1, spikelet and lemma of *Poa gaspensis* × 10; FIG. 2, spikelet of *P. labradorica* × 10.

constant and the specimens they cite, including the type, are readily matched in the variable series from single colonies of *P. eminens*.

Poa macrocalyx Trautv. & Meyer, Fl. Ochot. Phaenog. 103 (1856) has foliage and spikelets somewhat suggesting those of *P. labradorica* and Hultén, Fl. Kamtch. and Adj. Isl. i. 128 (1927) speaks of his specimens as "collected on the seashore, where they grow in the *Elymus* belt or in the subalpine meadows usually found inside that belt, often together with *P. eminens*." We have no record of the exact habitat of *P. labradorica*, but from its habit and aspect it is presumably the same as that of the related *P. eminens* and *P. macro-*

calyx. *P. labradorica* cannot be placed in the latter species: *P. macrocalyx* has the branches of the panicle very scabrous-hirtellous and loosely spreading, the branches in *P. labradorica* being glabrous and closely appressed; in *P. macrocalyx* the keel and lateral nerves of the lemma are densely silky-pubescent, in *P. labradorica* glabrous.

Poa **gaspensis**, n. sp., plus minusve dense caespitosa, culmis numerosis teretibus glabris strictis 1.5–5 dm. altis basi vaginis foliorum emortuum scariosis brunneis vestitis; caudicibus novellis foliosis, foliis erectis anguste linearibus 1–2 (in umbra –3) dm. longis 1–4 mm. latis utrinque scabridulis vel glabris apice acutis vel subacutis calloso-cucullatis, ligulis truncatis 0.5 mm. longis; foliis caulinis 2 vel 3 latioribus brevioribusque, vaginis arctis lamina valde longioribus, laminis 1.5–8 cm. longis 2–5 mm. latis, ligulis 2–6 mm. longis; panicula subcylindrica vel anguste ovoidea 3–12 cm. longa 0.6–6 cm. diametro, ramis capillaribus remotis glabris vel scabrellis divergentibus vel adscendentibus, ad apicem floriferis; spiculis anguste ovatis valde compressis 3–5 mm. longis pedicellatis 3–4-floris; glumis hyalinis lucidis ovatis acuminatis 3-nerviis margine late albescentibus carina ciliatis, superiore 2.8–4.5 mm. longa; lemmatibus hyalinis albido-marginatis acutis vel subacutis 2.5–4.5 mm. longis 5-nerviis, nervo medio supra mediam longe piloso ad apicem scabro-ciliato, nervo marginali supra mediam longe piloso, nervo intermedio ad basin piloso; antheris 1.2–1.4 mm. longis.—Gaspé County, Quebec: wooded alluvial banks and gravelly and sandy beaches and bars of River St. Anne des Monts, July 14–16, 1906, *Fernald & Collins*, nos. 343, 344 (type in Gray Herb.), 345, 347, 356, 358. No. 339 from sienitic rock-slides, Table-topped Mountain, August 9–11, 1906, probably belongs here but has extremely large spikelets.

Poa gaspensis has the habit of *P. alpina* L., *P. paucispicula* Scribn. & Merr. and *P. bracteosa* Kom. From *P. alpina* it is at once distinguished by its more slender caudices, narrower leaves, longer and narrowed glumes and more hyaline glumes and lemmas, the latter with the long pilosity of the nerves running much higher. *P. paucispicula* of Alaska has the second glume with a smooth keel; the lemmas nearly smooth, except for pilosity toward the base. *P. bracteosa* of Kamtchatka is described as having the glumes and lemmas glabrous (except for the cobweb at base of the latter) and Hultén states that the anthers are 2–2.5 mm. long (in *P. gaspensis* less than 1.5 mm.).

Some specimens of *Poa gaspensis* suggest *P. alpigena* (Hartm.) Lindm. f., which abounds on the Gaspé Peninsula and is highly variable, a loosely stoloniferous species; others suggest *P. alpina*, which is also abundant in the region. It is possible that *P. gaspensis* may have originated through crossing of these two dominant species,

but along the Ste. Anne des Monts it is now a common and characteristic plant. It is there associated with other endemics of the Ste. Anne valley, which are not closely related to other species in the region: *Salix chlorolepis* Fern., *S. obtusata* Fern., *Fragaria multicipita* Fern., *Solidago mensalis* Fern. and *S. chlorolepis* Fern., and with still other near-endemics (known in the Ste. Anne valley but also in other adjacent areas) such as *Salix hebecarpa* Fern., *Arenaria marcescens* Fern., *Ranunculus Allenii* Robins., *Saxifraga gaspensis* Fern. and *Vaccinium nubigenum* Fern. These are, for the most part, local representatives of species of western North America, Siberia or the Arctic; and *Poa gaspensis* seems to belong with them in having its nearest affinity with two species of the North Pacific region, *P. paucispicula* of Alaska and *P. bracteosa* of Kamtchatka.

Glyceria striata (Lam.) Hitchc., var. **stricta** (Scribn.), n. comb. *Panicularia nervata stricta* Scribn. in Nelson, U. S. Dept. Agric. Div. Agrost. Bull. xiii. 44 (1898). *P. nervata rigida* Nash in Rydb. Mem. N. Y. Bot. Gard. i. 54 (1900). *G. nervata stricta* Scribn. acc. to Nash, l. c. as syn. (1900). *G. nervata rigida* (Nash) Lunell, Am. Midl. Nat. iv. 223 (1915). *P. rigida* (Nash) Rydb. Fl. Rocky Mts. 83, 1060 (1917). *P. nervata*, f. *stricta* (Scribn.) House, Bull. N. Y. State Mus. ccliv. 118 (1924), at least as to name-bringing synonym.

It has recently been pointed out by Professor A. S. Hitchcock, that the common plant of eastern America which we have been calling *Glyceria nervata* (Willd.) Trin. (1830) has an earlier specific name and he, therefore, publishes the combination *G. striata* (Lam.) Hitchc.[1] The new combination goes back to *Poa striata* Lam. Tabl. Encycl. i. 183 (1791), while *G. nervata* rests upon *Poa nervata* Willd. Sp. Pl. i. 389 (1797). Lamarck's plant came from Virginia and is, unquestionably, the common grass of the eastern United States. My purpose in this note is to direct attention to its more boreal representative which occurs across the continent northward, from Labrador to Alaska, southward into the northernmost states and along the Rocky Mountains to New Mexico and Arizona and even into Mexico. This is the grass distinguished very inadequately by Scribner as *Panicularia nervata stricta* and variously treated by other students: as a species, *P. rigida*, by Rydberg; as a mere form by House, and as not worthy any recognition at all by Hitchcock.[2]

[1] Hitchc. Proc. Biol. Soc. Wash. xli. 157 (1928).

[2] Hitchc. in Abrams, Ill. Fl. Pacif. States, i. 213 (1923), where the variety, which alone occurs in Washington and Oregon, is not mentioned and an illustration of the eastern plant, borowed from Britton & Brown, is used to represent the very different western one.

The very different interpretations of var. *stricta* above indicated are clear evidence that the plant is not generally well understood. The only author who has given a good account of it is Rydberg, whose excellent diagnostic characters clearly indicate that he has studied the plants:

Leaf-blades flat and lax; lemma slightly scarious-margined; branches of the inflorescence long; empty glumes obtuse. . 1. *P. nervata.*
Leaf-blades conduplicate, stiff, ascending; lemma distinctly scarious-margined; branches of the inflorescence short, strongly ascending, not drooping . . . . . 3. *P. rigida.*

And again: P. NERVATA with stems 3–10 dm. high, leaf-blades 1.5–3 dm. long, 4–10 mm. wide, scabrous above, panicle 7–20 cm. long; P. RIGIDA with stems 3–4 dm. high, leaf-blades 5–15 cm. long, 3–4 mm. wide, panicle about 1 dm. long, lemma rounded-oval, usually purplish.

Although separating *Panicularia rigida* as a plant of the Rocky Mts., Rydberg did not go far enough, for it is the wide-ranging northern representative of *Glyceria striata* (*G. nervata*); and in extending the range of the latter to Alaska he was including much which belongs with the former.

In the field and in the herbarium I have long recognized the two extremes as either very strong varieties or fairly distinct species and a re-study of the material confirms these earlier decisions. In view, however, of the too frequent breaking down of characters it seems to me better to express the facts, to treat them as extreme geographic varieties. Some points, not emphasized by Rydberg, should be further stressed and I should distinguish the two as follows:

G. NERVATA. Culms 0.3–1.5 m. high: leaves flat, up to 1 cm. broad, harsh above; the uppermost with blade 1–3 dm. long: panicle 1–3 dm. long, lax and open, the loosely ascending branches in age becoming divergent or sometimes even reflexed: spikelets greenish, rarely purplish: lemmas barely if at all scarious-tipped.—Eastern United States, extending north to southern Ontario, southern Quebec, Prince Edward Island, Cape Breton Island (Nova Scotia) and southern Newfoundland, commonly in boggy or peaty meadows, swales and thickets.

Var. STRICTA. Culms usually lower, 0.2–0.9 m. high, and more slender: leaves flat or conduplicate, up to 5 mm. broad, smooth or barely scabrous above; the uppermost with blade 0.3–2 dm. long: panicle 0.5–1.5 (rarely –2) dm. long, with the branches strongly ascending, only rarely divergent or reflexed in age: spikelets purple, rarely green, commonly larger: lemmas more rounded, with broad scarious tip.—Hamilton Inlet, Labrador to Alaska, south to Newfoundland, Nova Scotia, Maine, northern New Hampshire, western

Massachusetts, central and western New York, northern Illinois, Iowa, South Dakota, New Mexico, Arizona and Oregon, and in Mexico to Hidalgo; commonly in rich or calcareous soils.

Glyceria **arkansana**, n. sp., ab *G. septentrionali* differt culmis crassis 1 cm. diametro; foliis flaccidis 1–1.8 cm. latis subtus laevibus supra scabridulis, ligulis hyalinis 1 cm. longis; paniculis 4–7 dm. longis, ramis laevibus adscendentibus deinde divergentibus; spiculis linearibus 10–15-floris 1.5–2 cm. longis; glumis oblongo-ovatis laevibus subcoriaceis, superiore 2.5–3.5 mm. longa; lemmatibus membranaceis oblongo-ovatis subacutis 2.5–3 mm. longis hirtellis valde 7-costatis.—Arkansas and Louisiana. Arkansas: common in swamp, Varner, Lincoln County, April 29, 1898, *B. F. Bush*, no. 9, as *Panicularia fluitans* (type in Gray Herb.). Louisiana: without definite locality, *Hall*, no. 685; infrequent in wet ground, Gretna, May 10, 1899, *C. R. Ball*, no. 362, as *Panicularia fluitans*.

Glyceria arkansana is a coarser plant than *G. septentrionalis*, with broader and more flaccid leaves and larger panicles. Yet, its strongest characters are in the smaller and more delicate spikelets. In *G. septentrionalis* the glumes are firmer, the upper one 4.5–5.7 mm. long (in *G. arkansana* 2.5–3.5 mm.). The coriaceous lemmas of *G. septentrionalis* are 3.6–5.5 mm. long, scabrous-puberulent and only obscurely 7-nerved; the lemmas of *G. arkansana* only 2.5–3 mm. long, thin or membranaceous, definitely hirtellous and very sharply and prominently nerved. *G. fluitans* (L.) R. Br., to which *G. arkansana* is likewise related, has the glumes and lemmas as large as in *G. septentrionalis* but the lemmas thinner and less pubescent; *G. borealis* (Nash) Batchelder has as small and as delicate spikelets as *G. arkansana* but the lemmas quite glabrous; and *G. leptostachya* Buckl. and *G. acutiflora* Torr., though of the same group, are so different as scarcely to need comparison with the plant of Arkansas and Louisiana.

(*To be continued*)

NOTES FROM THE HERBARIUM OF THE UNIVERSITY OF WISCONSIN—IV.

Norman C. Fassett.

Aconitum noveboracense Gray, var. **quasiciliatum**, n. var., caulibus saepe recumbentibus, 6–10 dm. longis; foliis 5–20 cm. latis, orbiculatis, fere ad basem 5–7-divisis, fere glabris minutis setulis dispersis marginis revolutae exceptis; sepalis caeruleis, supremis 1.5 cm. longis, in rostrum horizontale contractis, filamentis superne

caeruleo-striatis, infra albis, planis; antheris orbiculatis, 0.4–0.6 mm. diametro; carpellis 2–3, 8–9 mm. longis, pedicellis ascendentibus vel recurvatis.

Stems often reclining, 6–10 dm. long; leaves 5–20 cm. broad, orbicular, 5–7-cleft nearly to the base, nearly glabrous except for minute scattered hairs along the inrolled margin; sepals blue, the uppermost 1.5 cm. long, rather abruptly contracted to a horizontal beak; filaments streaked with blue above, flat and white below; anthers orbicular, 0.4–0.6 mm. in diameter; mature carpels 2–3, 8–9 mm. long, on ascending or somewhat recurved pedicels.—Wisconsin: small precipitous shaded gorge, Mill Bluff, Lodi Mills, September 29, 1928, *N. C. Fassett*, no. 7610 (type in Herb. Univ. of Wis.); September 19, 1925, *N. C. Fassett*, no. 2686; Pewit's Nest Gorge, Baraboo, August 20, 1927, *Bernard Harkness*.[1] Iowa: Postville, July 4–6, 1904, *Pammel, Orr & Wilson;* June 22, 1918, *L. H. Pammel;* Dubuque County, June 18, 1922, *Pammel & Trenk*.

The type collection is from Sauk County, in one of the shallow gorges that often break the perpendicular faces of the sandstone cliffs cut by the Wisconsin River. Growing for the most part ten to twenty feet above the top of the talus slope, it can be collected only with some difficulty. This material differs from New York material of *A. noveboracense* (loaned from the New York State Museum through the courtesy of Mr. H. D. House and Mr. Neil Hotchkiss) by its small anthers, these being only 0.4 mm. long, as opposed to those of the more eastern species, which are 0.6 mm. long. This difference, however, does not hold in the other material of the Wisconsin and Iowa plant. The plants of the author's collections were somewhat recumbent down the face of the cliffs, so that the mature capsules were on recurved (thus erect) pedicels, and the inflorescence tended to become secund on each branch. The Iowa plants were more erect.

Material of *A. noveboracense* from Oxford, New York, collected by Mrs. M. H. Fitch, July 20, 1889 (the type of the species came from Oxford) has a rather strict inflorescence and perfectly glabrous leaves. A sheet from "Peckamoose, Catskill Mts." collected by C. H. Peck, approaches the Wisconsin plant in its looser inflorescence, and leaves somewhat pubescent toward the margin.

The Iowa specimens here cited were kindly loaned by Drs. Pammel and Cratty, and formed the bases for the reports of *A. noveboracense*[2] and *A. uncinatum*[3] from Iowa. The latter species is accredited to

[1] Specimen in the Herbarium of the Milwaukee Public Museum.
[2] Plant World viii. 43 (1905).
[3] Iowa Acad. Sci. Proc. cxxx. 272 (1923?).

Wisconsin in Gray's Manual and by Britton and Brown, but I have seen no specimens from this state. Dr. Rydberg writes: "We have one specimen of *Aconitum uncinatum* from Wisconsin. It was collected by Lapham at Milwaukee. I think that it should be referred to that species, but the specimen represents a plant somewhat stiffer than the eastern form and with more of the five-lobed leaves. We have no specimens of *A. uncinatum* from any place between Ohio and Wisconsin." It may be added that Lapham used labels with the printed data: I. A. LAPHAM, MILWAUKEE, WISCONSIN, and often wrote in simply the name of his plant, with no information as to locality. He used these labels for plants which did not come from Wisconsin, making confusion similar to that caused in somewhat like manner by Engelmann.[1] On some of his labels Lapham has written "Milwaukee," but Milwaukee, to him, included territory anywhere within twenty-five miles of the present city. There is no *Aconitum* in the Lapham herbarium, now at the University of Wisconsin.

The Aconitums of the Gray's Manual region may be distinguished as follows:

a. Rachis of the inflorescence glabrous, only the distal end of each pedicel pubescent; hooded sepal 17–20 mm. long; leaves 3–(–5)-cleft.....*A. uncinatum*

a. Rachis and pedicels pubescent; hooded sepal 14–15 mm. long; leaves 5–7-cleft....*b.*

b. Pubescence spreading; leaves glabrous except sometimes on the inrolled margins; hood arched; flowers blue....*c.*

c. Carpels 12–20 mm. long at maturity; leaf-margins glabrous.....*A. noveboracense*

c. Carpels 8–9 mm. long at maturity; leaf-margins appearing ciliate, but really with scattered hairs on the inrolled part.....*A. noveboracense*, var. *quasiciliatum*

b. Pubescense appressed-incurved; leaves with closely appressed hairs; leaf-margins with copious stiff hairs, not inrolled; hood elongate, cylindrical; flowers white or yellowish.....*A. reclinatum*

In view of its short comparatively thick fruits it was at first intended to publish *A. noveboracense*, var. *quasicilatum* as a species. This plant, and the variety of Shooting Star next to be discussed, are both confined, so far as is known, to the unglaciated area of southwestern Wisconsin and neighboring states.

DODOCATHEON MEADIA L.—The common Shooting Star, on prairies, bluffs, and in woods, across southern Wisconsin, and north to Brown, rarely to St. Croix, County, is a stout plant, 2.5–6 dm. tall, with an

[1] See RHODORA XXV. 109 (1923).

ample umbel of from 6 to 18 pale lilac to white flowers. On the bluffs bordering the Mississippi River is found a plant much more slender in all its parts, from 2–3.5 dm. tall, with fewer (2–11, rarely 18) flowers of a deep claret color. In fruit the plants are very distinct. The stout pale-flowered plant has an ovoid-conical or broadly cylindric capsule, 5–7.5 mm. thick and 10–15 mm. long, with dark brown, nearly black seeds. The slender brilliant-flowered plant has a narrowly cylindric capsule, 3–4.5 mm. thick and 13–16 mm. long, with light castaneous or olive-brown seeds. A distinction observable in the fresh plants lies in the tips of the sepals and bracts, which, in the smaller variety, bear each a minute red glandular spot. These seem to fade at least partially when the plants are pressed.

These two plants have been grown side-by-side for 14 years in the garden of Dr. C. H. Bunting of this city, who transplanted the slender variety (the "Jewelled Shooting Star," he calls it) from La Crosse. Each has remained constant. Dr. Bunting has noted that while the stout plant, native to the vicinity of Madison, has reseeded and spread, the slender plant has not.

D. Meadia var. **amethystinum**, n. var., planta gracilis; scapis 2–3.5 dm. altis, floribus 2–11(–18); petalis intense rubicundo-purpureis; capsulis maturis cylindraceis, 3–4.5 mm. diametro, 13–16 mm. longis; seminibus solute castaneis vel olivaceis.—Wisconsin: Alma, June 25, 1928, *May Lees* (fruit); Cochrane, June, 1928, *Angeline Rohrer*, (flowers): Fountain City,[1] May 19, 1911, *H. C. Benke* (flowers); La Crosse, May 10, 1983, *Minnie Sheldon* (flowers); Prairie du Chien, June 2, 1928, *N. C. Fassett*, no. 7548 (fruit and flowers) (type in Herb. Univ. of Wis.); Madison, June, 1928, *C. H. Bunting* (fruit from individuals transplanted from La Crosse in 1914). Minnesota: Queen's Bluff, Winona, May 27, 1928, *J. M. Holzinger* (fruit).

The only intermediate seen was collected at West Salem, Wisconsin, 13 miles east of La Crosse, by Mr. N. W. Rowe. This plant resembles typical *D. Meadia* in habit, but has the cylindrical capsules and red-tipped sepals and bracts of var. *amethystinum*.

Although here treated as a variety, this plant may yet prove to have specific characters. Indeed it resembles *D. Meadia* less closely than it does some of the Rocky Mountain members of the genus, and seems fully as distinct as many plants of that region now accorded specific rank. It has much the aspect of *D. pauciflorum* and *D. radiatum*, but differs in having the filaments distinct; the capsule is much like that of *D. cylindrocarpum*, but is not circumcissile as in that species.

[1] Specimen in the Herbarium of the Milwaukee Public Museum.

I wish to express gratitude to Miss Lees, Miss Rohrer, Dr. Bunting, Professor Holzinger, and Mr. Rowe, for their help in assembling enough material to study this plant.

ASTER SERICEUS Vent, f. **albiligulata**, n. f., ligulis albis; floribus disci flavibus; bracteis viridibus non purpureis.—WISCONSIN: crumbling limestone bluff, Roxbury, September 29, 1928, *N. C. Fassett*, no. 7546 (TYPE in Herb. Univ. of Wis.).

In typical *A. sericeus* the disk flowers as well as the rays are purplish, and the involucral bracts are more or less marked with purple.

It is a coincidence that but a few rods from this white form of a normally purple-flowered plant, there was a plant of a closely related genus, normally white-rayed, whose rays were decidedly purplish.

ERIGERON CANADENSE L., f. **coloratus**, n. f., ligulis violaceis.—WISCONSIN: crumbling limestone bluff, Roxbury, September 29, 1928, *N. C. Fassett*, no. 7547 (TYPE in Herb. Univ. of Wis.). MASSACHUSETTS: New Bedford, *T. A. Greene*.

MADISON, WISCONSIN.

A TERATOLOGICAL FLOWER OF CORALLORRHIZA MACULATA.—On July 25, 1928, in the town of Pelham, Massachusetts, I collected a specimen of *Corallorrhiza maculata* Raf. growing under normal conditions. Upon examination later I noted that one of the flowers was markedly different from the others. An examination revealed the interesting fact that this flower was double, either due to fusion or to splitting. The sepals were normal in general appearance, but were five in number. Two were superior in position, two were lateral, and the fifth was basal underneath the lips which were two in number. Both of these lips were normal in size and color and were free to the base. There were two lateral petals and also a third petal which occupied a superior position between the two upper sepals. All of these sepals and petals were free. There were two columns which appeared normal except that they were fused at the sides. The whole plant was 13½ inches high with a raceme of 16 flowers of which all, except the one noted, were normal.—S. JUDSON EWER, Champaign, Illinois.

A DAY IN GASPÉ.

Arthur Stanley Pease.

On July 17, 1928, the writer and Professor F. B. Loomis, of Amherst College, in the course of an automobile trip around the Gaspé Peninsula, set out in the morning from Gaspé, and drove across the Dartmouth River to Ste. Majorique, and thence down the east shore of Gaspé Bay some miles beyond Grande Grève. There we left the car and walked to the lighthouse at Cape Gaspé, where we had the interesting experience of standing on the very northeastern tip of the Appalachian System, at the point at which it drops into the sea in a splendid cliff, perhaps six or seven hundred feet high.

On the open turfy and gravelly crests near the lighthouse I picked up *Artemisia borealis* Pall., the first Gaspé collection save on the higher Shickshocks (Mts. Albert and Pembroke); also *Draba incana* L. and *Euphrasia arctica* Lange. A somewhat toilsome scramble through scrubby firs and spruces along the crest of the limestone cliffs to the north disclosed *Primula laurentiana* Fernald and *Hedysarum alpinum* L., var. *americanum* Michx., but my earlier visions of collecting on the talus of these cliffs were rudely shattered by discovering that they drop vertically into the water with no talus at all and practically no vegetation on their sides. It was, accordingly, a temptation to turn inland to a line of dryish Devonian cliffs (of the Grande Grève formation, a series corresponding to the Lower Helderberg), parallel to the shore and about half a mile back from it. On these grow *Saxifraga Aizoon* Jacq., *Draba arabisans* Michx., and *Carex concinna* R. Br., but dryness, friability, and the lack of earthy talus made the spot rather unexciting, and I rejoined my companion for lunch at Grande Grève, none too well pleased with the result of the morning's collecting.

In the afternoon, however, fortune changed. Leaving Mr. Loomis to look for fossils on the Gaspé Bay side of the peninsula, I set out, across a narrow isthmus to the northeast, toward the St. Lawrence shore at Cape Rosier. The road at first ascends slightly, passes through woods, and then descends at a terrific grade (which I had been warned not to attempt with a car), down the side of steep cliffs which face the river but gradually retreat from it. A little beyond the bottom of the hill I was attracted by the continuation of these cliffs (again of the Grande Grève formation), covered at their tops

with low-lying mists, but revealing on their lower slopes a talus of great extent. Accordingly, much of the time in heavy rain, I climbed up this talus, which is loose and rather toilsome in passage, to its top, and there, partly on the finer parts of the talus and partly on the rocks of the cliff itself, found collecting to atone for the disappointment of the morning. Yellow *Cypripediums* grew in handsome clumps in the rocks and gravel, with flowers varying greatly in size; on the ledges *Arnica chionopappa* Fernald was in excellent flower and fruit, with *Dryas Drummondii* Richardson and *Potentilla nivea* L., var. *macrophylla* Seringe in fruiting condition and *Poa Sandbergii* Vasey (already known from cliffs at Carleton, Percé, and Bic) and *P. glauca* Vahl near at hand. A puzzling form of *Senecio pauperculus* Michx., var. *Balsamitae* (Muhl.) Fernald seemed worthy of collection,[1] while the talus also furnished *Amelanchier sanguinea* (Pursh) DC., var. *gaspensis* Wiegand, *Viola adunca* J. E. Sm., var. *glabra* Brainerd (a plant apparently somewhat general on the outer coast of Gaspé), and a single fruiting specimen of *Androsace septentrionalis* L., already known from the north shore of the St. Lawrence and from cliffs on the south coast in the vicinity of Marten River.

Three plants, however, proved of especial interest. One was a composite, the genus of which I did not recognize, though its leaves suggested an *Artemisia.* It had evidently flowered very early, for its inflorescence was already reduced to the somewhat dried-up involucres and receptacles, with an occasional achene still adhering, none of these features at all resembling *Artemisia.* The plant proves to be *Erigeron compositus* Pursh, var. *trifidus* (Hook.) Gray, already collected in this vicinity in 1923 by Brother Victorin, and by other collectors at Rivière à Pierre, and discussed by Fernald in RHODORA, **30** (1928): 122–123. Whether the Gaspé specimens are radiate or discoid we have, as yet, no evidence to show. A second treasure was true *Arabis Holboellii* Hornem., the second collection of the typical plant outside Greenland, the first being on calcareous cliffs east of Bic; while the third, and most interesting of all, was *Draba oligosperma* Hook., of which I collected one characteristic clump, apparently its first appearance from east of the Rocky Mountains of Alberta. For the identification or verification of a number of the species mentioned I am greatly indebted to Professor Fernald. Specimens of all have been deposited in the Gray Herbarium and duplicates of several in the herbarium of Amherst College.

[1] Forma *inchoatus* Fernald, RHODORA, **30**: 226.

When I rejoined my companion I was amused to find that the excavation being made in a hillside for the building of a garage near our lunching place had furnished enough fossils to occupy him all the afternoon without the trouble of further search along the shore, and with our load of fossils and plants we drove back to Gaspé, well satisfied with our day's experience.

Amherst College

Cladonia floridana in New Jersey.—In a recent paper, Mr. C. A. Robbins[1] has shown that the Cladonia which has been passing as *Cladonia beaumontii* (Tuck.) Wainio should be known as *C. floridana* Wainio, Tuckerman's type of *C. santensis* f. *beaumontii* on which Wainio's name was based being referable to a different species from that described by Wainio under the name *C. beaumontii*. *Cladonia floridana* is a coastal plain species, not common in herbaria, and is rare north of the Carolinas. Mr. Robbins[2] has recorded it from the vicinity of Wareham, Massachusetts, and the writer has collected it at two localities in the vicinity of Washington, D. C. (Landover, near Bladensburg, Maryland, and near Lanham, Maryland). No other records of its occurrence north of North Carolina are available. A small gathering of Cladonias made by the writer on sandy pine barrens at Inskip, Atlantic Co., New Jersey, on 2 Sept. 1928 and identified by Mr. Robbins included young plants of *C. floridana* Wainio and young fruited plants of f. *esquamosa* Robbins. Specimens have been deposited in the United States National Herbarium.—S. F. Blake, Bureau of Plant Industry, Washington, D. C.

[1] Rhodora **29**: 133–138. *pl. 157.* 1927.
[2] Rhodora **25**: 46. 1923; **27**: 51. 1925.

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Vol. 31. April, 1929. No. 364.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.—No. LXXXIII.

(*Continued from page 49.*)

IV. THE REPRESENTATIVES OF ELEOCHARIS PALUSTRIS IN NORTH AMERICA.

M. L. Fernald and A. E. Brackett.[1]

(Plates 181–184.)

Probably no group of the *Cyperaceae* in the flora of temperate North America has been more baffling to the student of local floras than the complex of plants which have passed as *Eleocharis palustris* (L.) R. & S. The present study of the group, begun in 1925, has been much interrupted and often quite discouraging, especially from the fact that plants superficially very similar have obviously different achenes and tubercles; it has consequently been necessary, before roughly classifying our plants, to study the achenes of each, and in too many instances the specimens are immature or sterile. Our study started as an attempt to get a clearer insight into the representatives of *E. palustris* in New England, eastern Canada and New-

[1] Amelia Ellen Brackett (1896–1926), born at North Berwick, Maine, October 4, 1896, died at Boston, Massachusetts, May 31, 1926. Miss Brackett graduated from Radcliffe College in 1920 and received her master's degree from Radcliffe in 1921. At the time of her sudden and fatal illness (appendicitis) she was preparing to present herself for the doctorate. Miss Brackett had been temporarily employed as nomenclator at the Harvard Botanic Garden, as botanical artist at the Gray Herbarium, and at the time of her death she was general assistant in the herbarium of the Arnold Arboretum. Her capacity as a young systematist is shown in her revision of *Hypoxis* and studies of related genera, published in Rhodora, xxv. nos. 296 and 297 (1923); and her skill as an artist is demonstrated in those papers and in various plates contributed to Rhodora and other botanical journals.

The detailed measurements of the achenes, scales, sheaths, etc., summarized in the present paper, were made by Miss Brackett, but some of the drawings illustrating them were left incompleted. These have been generously put into form for publication by Dr. Henry K. Svenson.

foundland, but it has gradually broadened to cover all North America. In this work we have depended upon the material in the Gray Herbarium and the herbarium of the New England Botanical Club, supplemented by the very helpful material in the National Herbarium of Canada, loaned by Dr. Malte, the collection (rich in old specimens as well as new) of the Philadelphia Academy, loaned through Dr. Pennell, and specially selected and critical specimens from the New York Botanical Garden, loaned by Dr. Rydberg. To all the gentlemen who have so generously aided us we here express our appreciation and thanks.

As a result of the present study we are recognizing in North America eight species and two varieties which have passed as *Eleocharis palustris*. It has naturally been a problem, what to select as best standing for the Linnean *Scirpus palustris*, since Linnaeus's species was a complex. Long ago *Eleocharis uniglumis*, with the basal glumaceous scale spathiform, was separated off and European botanists have consistently treated *E. palustris* as a plant with 2 or 3 empty basal scales. More recently, Harald Lindberg, Acta Soc. pro Fauna et Fl. Fennica, xxiii. no. 7 (1902), has made a thorough study of the plants of northern Europe and has retained as *Scirpus palustris* the plant with firm subterete culms and elongate tubercles, distinguishing as a new species, *S. mamillatus*, the plant with soft compressed culms and low and broad tubercles and recognizing as a distinct species *S. uniglumis*. In view of this clear differentiation of the three species of northern Europe it is undoubtedly best to accept Lindberg's definition of *Scirpus* or *Eleocharis palustris*, which we have accordingly done. All three of the species of northern Eurasia, *E. palustris*, *E. mamillata* and *E. uniglumis*, are in North America, the first and third crossing the continent, the second (*E. mamillata*) seeming to be inseparable from the plant of the western half of the continent described, one year after *E. mamillata*, as *E. macrostachya* Britton.

In North America the *Palustres* are more complex than in Eurasia. A fourth Asiatic species, *E. kamtschatica*, crosses over to Alaska; another species, wide-ranging in North America, *E. calva* Torr., occurs also in eastern Asia and on the Hawaiian Islands; but the remaining species are, so far as known, strictly North American. One, *E. Smallii* Britton, originally recognized only from the Susquehanna valley, proves to be a widely distributed and highly variable

American species; the other two, here proposed as new, are confined to the region west of the Mississippi, one of them of wide range in the arid region west to Nevada and southward into Mexico, the other as yet known only from a limited area in northern California.

The results of our study are embodied in the following synopsis, with plates illustrating the essential points of the different species and varieties recognized.

a. Basal scales of spikelet usually 2 or 3 below the thinner fertile scales: culms 0.5–5 mm. in diameter (in dried material) at summit of the upper sheath....*b.*
  b. Tubercle elongate, much longer than broad: achenes 1.2–2.1 mm. long, narrowly obovoid or pyriform: culms subterete, rather firm.....1. *E. palustris.*
  b. Tubercle depressed-deltoid, umbonate or broad-ovate, as broad as or broader than long: achenes 1.2–1.6 mm. long, roundish or broad-obovoid....*c.*
    c. Culms firm or wiry, subterete: fertile scales loosely ascending, narrowly ovate to lanceolate, mostly acute or attenuate.....2. *E. Smallii.*
    c. Culms soft, flat or compressed: fertile scales appressed, ovate, obtuse or subacute.....3. *E. mamillata.*
a. Basal scales solitary, spathiform, usually completely encircling the base of the spikelet: culms from filiform to 2 (rarely 3) mm. in diameter at summit of the upper sheath....*d.*
  d. Culms terete or subterete, scarcely rigid: scales usually purple, reddish or purple-tinged....*e.*
    e. Tubercle lanceolate or conical to broadly deltoid or depressed, much shorter than the achene....*f.*
      f. Spikelets closely many-flowered: fertile scales often 40 or more, scarious-membranaceous, opaque, commonly brown or rufescent: achenes 1–1.4 mm. long: tubercles 0.2–0.45 mm. broad....*g.*
        g. Culms filiform, 0.5–1.5 mm. in diameter: spikelets 0.9–1.7 cm. long: fertile scales oblong to ovate; the lower and median 1.8–3 mm. long.....4. *E. calva.*
        g. Culms stout, 1–3 mm. in diameter: spikelets 2–4 cm. long: fertile scales lanceolate; the lower and median 4–5 mm. long.....5. *E. perlonga.*
      f. Spikelets loosely few-flowered: fertile scales 5–30, firm-membranaceous to subcoriaceous, commonly lustrous and castaneous or dark-purple; the lower and median 3–5 mm. long: achenes 1.2–1.8 mm. long: tubercle 0.2–1 mm. broad.....6. *E. uniglumis.*
    e. Tubercle ovoid, nearly equalling to larger than the achene, spongy and punctate: spikelets castaneous, loosely few-flowered.....7. *E. kamtschatica.*
  d. Culms flattened, rigid: scales whitish or stramineous, with brownish stripes.....8. *E. xyridiformis.*

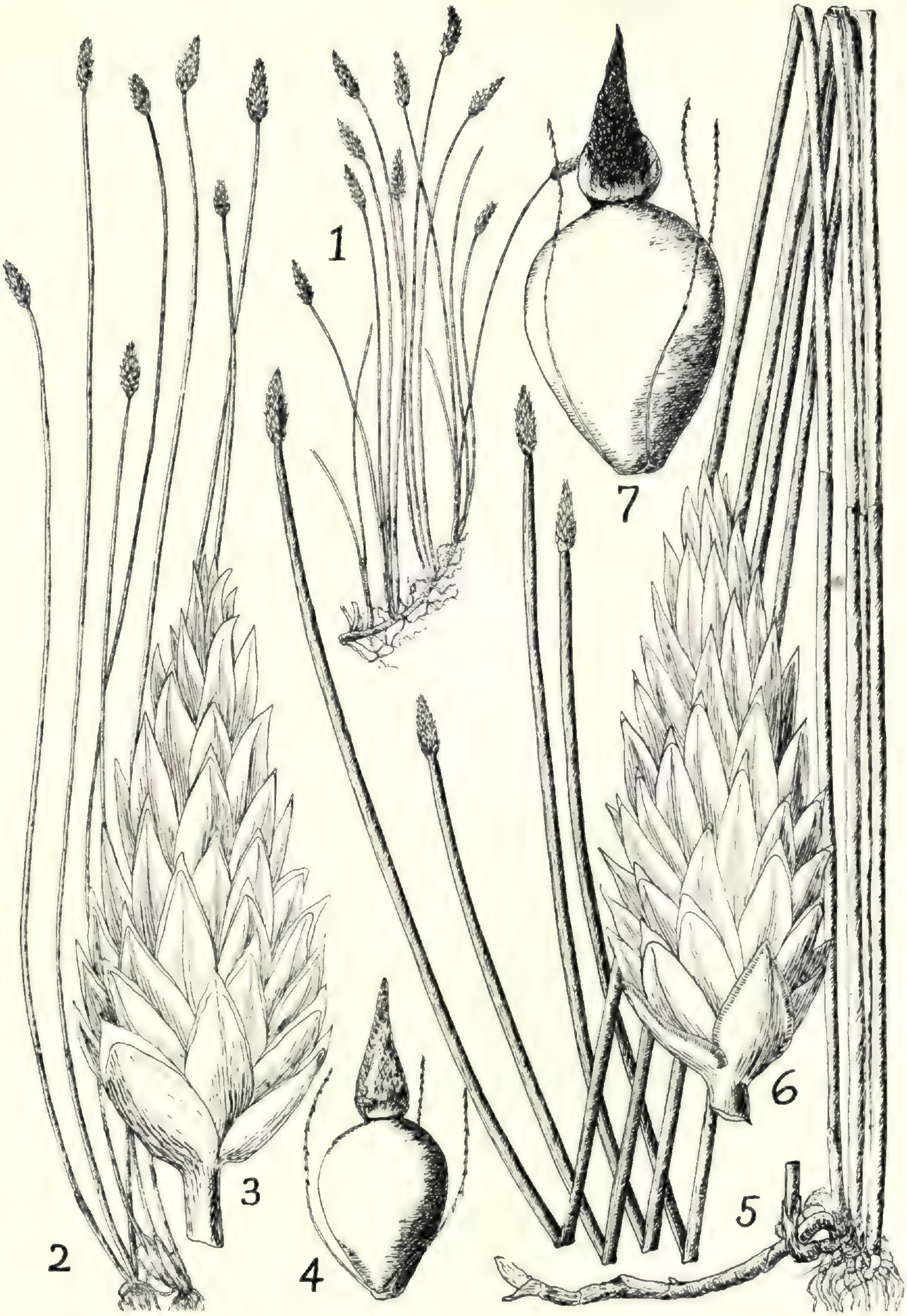
1. E. PALUSTRIS (L.) R. & S. Loosely stoloniferous to subcespitose, commonly (probably always) with widely creeping rootstocks: *culms* commonly terete, rarely a little compressed, *firm but scarcely rigid*, 0.1–1.9 m. high, from nearly filiform to stout, 0.5–5 mm. in diameter at the summit of the upper sheath: sheaths red or brown,

0.2–3 dm. long, rather loose: *spikelet* linear-cylindric to slenderly ovoid, 0.5–2.6 cm. long, 2.5–7 mm. thick, *closely many-flowered: the 2 or 3 basal scales firm*, ovate to oblong, obtuse: *fertile scales* oblong-ovate, *obtuse to subacute*, thin or membranaceous, *reddish-brown*, opaque, with pale scarious margin; the lower and median 3–5.5 mm. long: anthers 1.7–3 mm. long: *achenes obovoid to pyriform*, yellowish to castaneous, *1.2–2.1 mm. long*, 0.8–1.6 mm. broad: *tubercle lanceolate to conic-ovoid or slenderly bulbiform, much higher than broad*, 0.3–0.8 mm. broad at base: perianth of 4 bristles commonly reaching the tubercle, sometimes shorter or wanting. Figs. 1–7.

Represented with us by the two formal varieties:

Culms 1–4 dm. high, 0.5–2 mm. in diameter: lower and median fertile scales 3–4 mm. long: achenes 1.2–1.7 mm. long.....Var. *typica*.
Culms 0.5–1.9 m. high, 1.5–5 mm. in diameter: lower and median fertile scales 3.2–5.5 mm. long: achenes 1.4–2.1 mm. long.....Var. *major*.

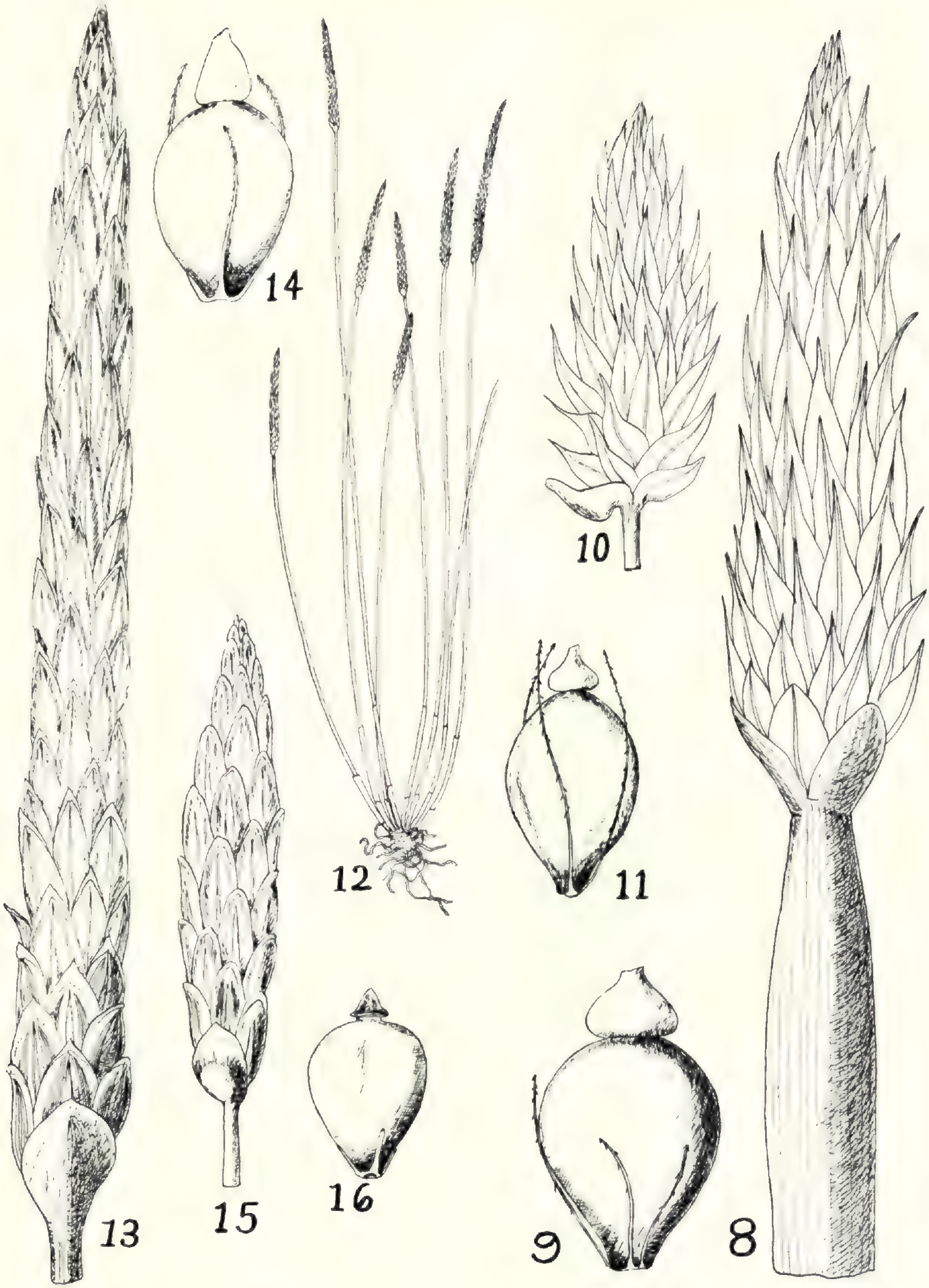
Var. typica Rouy, Fl. de Fr. xiii. 361 (1912) as *Heleocharis. Scirpus palustris* L. Sp. Pl. i. 47 (1753). *S. eupaluster* Lindb. fil. Acta Soc. Faun. Fl. Fenn. xxiii. no. 7: 4 (1902). *E.* (as *Heleocharis*) *eupalustris* Lindb. fil. l. c. 5 (1902). *S. palustris, a. typicus* Aschers. & Graebn. Syn. Mitteleur. Fl. ii. Ab. 2: 290 (1903), which see for further synonymy. *Trichophyllum palustre* (L.) Farwell, Rep. Mich. Acad. Sci. xv. 166 (1913).—Culms 1–4 dm. high, 0.5–2 mm. in diameter at summit of the upper sheath: spikelet broad-lanceolate or ovoid, often castaneous, 0.5–2 cm. long, 2.5–6 mm. thick: lower and median fertile scales 3–4 mm. long: anthers 1.7–2 mm. long: achenes 1.2–1.7 mm. long. Figs. 1–4.—Eurasia; and Newfoundland and the Labrador Peninsula to British Columbia, south to northern New England, northern Michigan, North Dakota and along the mountains to Wyoming, Idaho and Oregon. The following are representative American specimens. Newfoundland: pools in limestone barrens, Cape Norman, *Wiegand, Griscom & Hotchkiss*, no. 27,519; in dead water near tide-limit, East Brook, St. Barbe Bay, *Wiegand & Hotchkiss*, no. 27,521; bushy swale on flat north of Doctor Hill, *Fernald & Wiegand*, no. 27,520; shallow pool, Port Saunders, *Fernald, Wiegand & Kittredge*, no. 2702; wet meadow, Pointe Verde, Placentia, *C. S. Williamson*, no. 806. Quebec: Blanc Sablon, July 29, 1915, *C. W. Townsend;* muddy edge of pond, Pointe au Maurier, Charney, *St. John*, no. 90,178; slough in sand-dunes, Natashquan, *St. John*, no. 90,175; open springy places in arbor vitae swamp, New Richmond, August 1, 1904, *Fernald, Collins & Pease;* Little Metis, July 26, 1906, *Fowler;* meadows and swamps south and east of Bic, *Fernald & Collins*, no. 922. New Brunswick: Nepisiguit Grand Falls, *Malte*, no. 119,811; Lac Baker, *W. R. Watson*, no. 119,-818. Maine: marly bog, Monticello, *Fernald & Long*, nos. 12,797, 12,798; sandy river-margin, Dover, June 28, 1894, *Fernald;* ditches, North Berwick, June 16, 1894, *Parlin*. New Hampshire: edge of



A. E. Brackett del.

ELEOCHARIS PALUSTRIS

FIGS. 1–4, var. TYPICA; 5–7, var. MAJOR.



A. E. Brackett and H. K. Svenson del.

ELEOCHARIS

FIGS. 8–11, E. SMALLII; 12–14, E. PERLONGA; 15 and 16, E. CALVA.

Fish Pond, Columbia, *Pease*, no. 16,739; Lime Pond, Columbia, *Fernald & Pease*, nos. 16,716, 16,719; sphagnum, Alstead, *Fernald*, no. 257. VERMONT: Willoughby, June 23, 1892, *Kennedy;* miry pool east of Hotel, Willoughby Lake, July 11, 1900, *Brainerd;* shore of Lake Champlain, Highgate Springs, May 28, 1880, *E. S. Hoar.* UNGAVA: Fort George, July 26, 1887, *J. M. Macoun.* ONTARIO: wet places, Blackwater River, Lake Nipigon, July 8, 1884, *J. Macoun;* Lake Superior, July 19, 1869, *J. Macoun.* MICHIGAN: Little Iron River, *Gillman*, no. 50. SASKATCHEWAN: without definite locality, 1858, *Bourgeau;* Spur Creek, *J. Macoun*, no. 16,375; Moose Jaw, *J. Macoun*, no. 16,373. NORTH DAKOTA: wet soil, Leeds, July 2, 1906, *Lunell.* ALBERTA: Jaspar, *Malte*, no. 108,024. IDAHO: wet meadow, Corral, Blaine County, alt. 1740 m., *Macbride & Payson*, no. 3824. WYOMING: meadow, North Pilot Butte, 1878, *C. Richardson;* Black Rock Springs, *A. Nelson*, no. 3725 (as *Carex teretiuscula*). OREGON: near Grizzly Butte Camp, Crook County, alt. 1040 m., *Leiberg*, no. 304; Swan Lake Valley, Klamath County, *Applegate*, no. 768. WASHINGTON: Kittitas County, alt. 600 m., *Sandberg & Leiberg*, no. 705; Grand Coulee, *Griffiths & Cotton*, no. 502; meadow, Granville, *Conard*, no. 352. BRITISH COLUMBIA: Donald, *J. Macoun*, no. 28.

Typical *Eleocharis palustris* (FIGS. 1–4), as shown by the European descriptions and plates, is a low plant, uniformly treated by the recent European botanists as rarely if ever exceeding 4 dm. in height. In Europe the extremely small plants, only 1 dm. or less in height, are sometimes separated as *E. palustris*, var. *arenaria* Sonder and var. *minor* Coss. & Germ. The small plant, which is essentially boreal in America, is often very glaucous and the name *E. palustris*, subvar. *glaucescens* (Willd.) Coss. & Germ. (1845) is often applied to it. Whether this is the true *Scirpus glaucescens* of Willdenow we are unable to determine. As pointed out, in the discussion of *E. uniglumis*, Willdenow's species was said to have flattened culms and 3 style-branches, although Asa Gray and others have identified it with *E. palustris.*

Var. MAJOR Sonder, Fl. Hamb. 22 (1851). *E. palustris*, a *aquatilis* Schur, Enum. Pl. Transs. 690 (1866). *Scirpus palustris*, var. *major* Baumg. acc. to Schur, l. c. (1866). *S. pal.*, forma *Casparyi* Abromeit, Schrift. d. Physik. Oekonom. Gesellsch. Königsb. xxix. 88 (1889). *E. pal.*, var. *vigens* Bailey in Britton, Journ. N. Y. Microsc. Soc. v. 104 (1889). *E. crassa* C. A. Meyer ex Meinsh. Acta Hort. Petrop. xviii. 262 (1901). *S. crassus* C. A. Meyer ex Meinsh. l. c. (1901). *Trichophyllum palustre*, var. *vigens* (Bailey) Farwell, Rep. Mich. Acad. Sci. xxi. 358 (1920). *E. palustris* of most American auth.—Culms 0.5–1.9 m. high, 1.5–5 mm. in diameter at the summit

of the upper sheath: sheaths comparatively loose, 0.3–3 dm. long: spikelet lanceolate to ovoid, 0.7–2.6 cm. long, 2.5–7 mm. thick: lower and median fertile scales 3.2–5.5 mm. long: anthers 1.7–3 mm. long: achenes 1.4–2.1 mm. long, 1–1.6 mm. broad. Figs. 5–7.— Shallow to comparatively deep water of sandy, gravelly or muddy lake- or pond-margins, river-banks or marshy shores, Labrador and Newfoundland to British Columbia, south generally to Pennsylvania, Michigan, Illinois, Iowa, South Dakota, Wyoming, Idaho and northern California. The following, selected from a large representation, are characteristic. Labrador: small lake near mouth of Mulligan River, Lake Melville, *Wetmore*, no. 103,127. Newfoundland: Whitbourne, *Robinson & Schrenk*, no. 121; Tilt Cove, *Fernald, Wiegand & Darlington*, no. 4699; Rushy Pond, *Fernald et al.*, nos. 4697, 4698, 4700; Lookout Mountain, Bonne Bay, *Fernald & Wiegand*, no. 2707; Birchy Cove (Curling), *Fernald & Wiegand*, no. 2703; Sand Bank, west of Burgeo, *Fernald, Long & Fogg*, no. 110. Quebec: Brest, *St. John*, no. 90,176; Natashquan, *Victorin & Rolland*, no. 18,124; Rivière Mingan, *Victorin & Rolland*, no. 25,775; Rivière des Caps, Anticosti, *Victorin & Rolland*, no. 27,513; Rivière Cap Chat, *Fernald & Smith*, no. 25,496; Berthier-en-bas, *Rousseau*, no. 20,163; Lac St.-Jean, *Victorin*, no. 15,114; Black Lake, *Fernald & Jackson*, no. 12,032; Shawinigan Falls, August 1, 1923, *Chamberlain & Knowlton;* Ile Plate, near Montreal, *Victorin*, no. 731; Philipsburg, August 10, 1923, *Knowlton*. Magdalen Islands: Pointe-de-l'Est, Ile de la Grande-Entrée, *Victorin & Rolland*, no. 9352. Prince Edward Island: Lower Sea Cow Pond, *Fernald, Long & St. John*, no. 6953; Victoria Road, *J. Macoun*, no. 32,219. New Brunswick: Bass River, Kent County, 1869, *Fowler;* Woodstock, *Fernald & Long*, no. 12,802; Hampstead, *Fassett*, no. 2187; Hammond, *Svenson & Fassett*, no. 2079. Nova Scotia: Bay St. Lawrence, Cape Breton, August 14, 1904, *Churchill;* South Ingonish, *Nichols*, nos. 698 and 879; Sable Island, *J. Macoun*, nos. 22,648, 77,163, *St. John*, no. 1152; Five-Mile River, *Pease & Long*, no. 20,142; Block House, *Fernald & Long*, no. 23,374; Havelock, *Fernald & Long*, nos. 23,373 and 23,375; Cedar Lake, *Fernald, Bean & White*, no. 20,136; Beaver Lake, *Long & Linder*, nos. 20,134, 20,135; Yarmouth, *Howe & Lang*, no. 160; Salmon Lake, *Fernald, Bissell, Graves, Long & Linder*, no. 20,139. Maine: Pettiquaggamas Lake, *Fernald*, no. 122; Winn, *Fernald & Long*, nos. 12,795, 12,796; Upper Stillwater, July 16, 1892, *Fernald;* Orono, *Fernald & Long*, no. 12,805; Kidney Pond, July 21, 1919, *Graves;* Charlotte, *Fernald*, no. 1383; Rockland, *Fernald*, no. 1389. New Hampshire: Lake Umbagog, Cambridge, *Pease*, no. 16,548; Stewartstown, *Pease*, no. 12,631; Willey Pond, *William Oakes;* Enfield Pond, July 28, 1890, *Kennedy*. Vermont: West Danville, July 13, 1900, *Brainerd;* Franklin, July 16, 1916, *Knowlton;* Colchester, *Blake*, nos. 2100, 2439; Highgate Springs, August, 1873, *Jesup;* South Burlington, August 3, 1921, *Knowlton;* Athens, *Wheeler*.

MASSACHUSETTS: Topsfield (as a new but unpublished species), *Chas. Pickering* (herb. Phil. Acad.); Tewksbury, *Pease*, no. 2968; Jamaica Plain, June 28, 1878, *Faxon;* Eastham, *F. S. Collins*, no. 2307; New Marlborough, June 26, 1912, *Hoffmann;* Stockbridge, August 26, 1902, *Hoffmann.* CONNECTICUT: East Hartford, *Driggs*, no. 13; East Lyme, *Graves*, no. 222; Stratford, July 4, 1901, *Harger.* NEW YORK: Lake Harris, Essex County, *House*, no. 7349; Clear Lake, Adirondack Lodge, August 30, 1892, *Britton;* Morristown, *Fernald, Wiegand & Eames*, no. 14,186; Lewis Point, Oneida Lake, *House*, no. 14,220; Fisher's Landing, *Robinson & Maxon*, no. 82; Selkirk, *Fernald, Wiegand & Eames*, nos. 14,188, 14,189; Summit Marsh, Spencer, *Eames, Fernald & Wiegand*, no. 14,593; Cortland, *Eames*, no. 5911; Dryden, *Wiegand*, no. 19,424; Buffalo, *G. W. Clinton;* Seaford, Long Island, *Ferguson*, nos. 5605, 5914. NEW JERSEY: Nordhoff, *Dautun*, no. 18. PENNSYLVANIA: Long Pond, Pocono Mts., August 1, 1860, *Porter;* Tinicum, September, 1866, *Porter;* Luzerne County, July, 1896, *S. Brown.* UNGAVA: Fort George, July 26, 1887, *J. M. Macoun.* ONTARIO: Wolfe Island, July 8, 1860, *Wm. Boott;* Lake Nipigon, *J. Macoun*, no. 32,208; Port Arthur, July 6, 1888, *B. H. Smith.* MICHIGAN: Sault Ste. Marie, July, 1865, *Porter;* Port Huron, July 9, 1892, *Dodge;* near Lansing, July 28, 1898, *Bailey;* Indian River, August 8, 1890, *C. F. Wheeler;* Keweenaw Co., *Farwell*, nos. 675, 773. WISCONSIN: Green Bay, June, 1882, *Schuette;* Western Union Junction, Racine County, *Wadmond*, no. 3144. ILLINOIS: south of Thornton, Cook Co., June 9, 1897, *A. Chase.* MANITOBA: Churchill, *J. M. Macoun*, no. 79,220; Grand Beach, Lake Winnipeg, *Malte*, no. 106,701. IOWA: Story City, *Combs & Ball*, no. 439. SOUTH DAKOTA: Aberdeen, *Griffiths*, no. 853. ALBERTA: Red Deer, *Malte & Watson*, no. 119,810; Vermillion Lakes, *S. Brown*, no. 688. MONTANA: Big Fork, July 28, 1908, *Clemens.* WYOMING: Fort Bridger, August 6, 1873, *Porter.* COLORADO: Parlin, Gunnison Co., August 12, 1901, *B. H. Smith.* IDAHO: Lake Tesimini, *Heller*, no. 685; St. Anthony, *Merrill & Wilcox*, no. 793. UTAH: in herb. Phil. Acad. on a very mixed sheet occurs a label bearing the numbers 117 and 577, and the localities and dates, "Glenwood and Rabbitt Valley" and "May 27th and Aug. 15th, 1876," *L. F. Ward.* This label accompanies mixed material of *E. calva* and *E. palustris*, var. *major;* the latter is ripe, the former in anthesis. The specimen of *E. palustris*, var. *major* presumably came from Rabbit Valley, Aug. 15th. CALIFORNIA: Russian River, north of Cloverdale, July 9, 1902, *Heller*, no. 5828. OREGON: Narrows, *Griffith & Hunter*, no. 247; Juano Valley, *Griffith & Hunter*, no. 366; Chemawan, *Nelson*, no. 1204. WASHINGTON: western Klikitat Co., *Suksdorf*, no. 90; Grand Coulee, *Griffith & Cotton*, no. 452; Cow Creek, *Griffith & Cotton*, no. 523; Newport, *Kreager*, no. 453. BRITISH COLUMBIA: Victoria Road, Vancouver Island, June 20, 1887, *J. Macoun;* District of Renfrew, *Rosendahl & Brand*, no. 87; Kennedy

Lake, Vancouver I., *J. Macoun*, no. 78,801; Revelstoke, *J. Macoun*, no. 7375; Prince Rupert, *Malte*, no. 119,802.

2. E. Smallii Britton, Torreya, iii. 23, fig. 2 (1903).—Loosely stoloniferous to subcespitose: *culms firm or wiry*, subterete, very slender to rather stout, 0.5–2.5 (except in over-pressed material) mm. in diameter at the summit of the upper sheath, 2.5–9 dm. high: *spikelet* slenderly lance-attenuate to narrowly ellipsoid-ovoid, acute to obtusish, 0.5–2 cm. long, 2.5–5 mm. thick, *loosely-flowered:* the 2 or 3 basal scales narrowly ovate to oblong, obtuse: *fertile scales* in well developed spikelets *loosely ascending, with spreading-ascending tips* (closely imbricated only in poorly developed spikelets); the lower and median lanceolate to narrowly ovate, *acute, often slender-tipped*, 3–5 mm. long, *very thin and scarious*, with 2 purple convergent bands: anthers 1–1.8 mm. long: *achenes rounded-obovoid, 1.2–1.6 mm. long*, 0.8–1.2 mm. broad, yellowish to dark brown: *tubercle broadly ovate, as broad as or broader than long*, often somewhat depressed, about 0.4 mm. broad at base: perianth wanting or more commonly of delicate bristles reaching the tubercle. (Figs. 8–11.)—Peaty and wet sandy swamps, shores and pond- and river-margins, southwestern Nova Scotia to Michigan and Nebraska, south to Delaware, Pennsylvania, Indiana, Illinois and Missouri. The following, selected from a large representation, are characteristic. Nova Scotia: New Germany, *C. A. Hamilton*, in hb. Geol. Surv. Can., no. 80,822. Harper Lake, *Fernald & Long*, no. 23,376; Upper Wood's Harbor, *Fernald & Fassett*, no. 23,540; Salmon Lake, *Fernald, Bissell, Graves, Long & Linder*, nos. 20,140, 20,143; Butler's Lake, Gavelton, *Fernald, Long & Linder*, no. 20,144; Trefry's Lake, Arcadia, *Fernald & Long*, no. 20,170. New Brunswick: Grand Menan, August, 1889, *J. I. Northrop.* Maine: Foxcroft, *Fernald*, no. 302; Fairfield, *Fernald & Long*, no. 12,800; Torrey Pond, Deer Isle, *Hill*, no. 1982; Frankfort, *Fernald & Long*, no. 12,801; Bristol, *Chamberlain*, no. 408; Ocean Point, *Fassett*, nos. 439, 828; Woolwich, *Fernald & Long*, no. 12,806; Green, *Scribner*, no. 104; Wilson's Pond, Cumberland, *Chamberlain*, no. 624; Limington, *Fernald & Long*, no. 12,794. New Hampshire: West Stewartstown, *Fernald & Pease*, no. 16,941; Cherry Pond and Little Cherry Pond, Jefferson, *Pease*, nos. 14,453, 12,921; Alstead, *Fernald*, no. 257. Vermont: Fifield Pond, August 4, 1901, *E. C. Kent;* Spectacle Pond, Wallingford, September 4, 1898, *Eggleston & Ross;* Peacham, June, 1881, *F. Blanchard;* Bowen Pond, Sunderland (alt. 763 m.), *Eggleston*, no. 2133. Massachusetts: Amesbury, 1900, *A. A. Eaton;* Lynnfield, June 17, 1879, *Young;* Swain's Pond, Melrose, June 17, 1879, *Young;* South Framingham, July 21, 1890, *Sturtevant;* Holbrook, June 18, 1899, *Williams;* Cooper's Pond, Carver, *Fernald, Hunnewell & Long*, no. 8888; Weweantet River, Wareham, *Fernald*, no. 820; Freetown, *Sanford*, no. 823; Pocasset, Bourne, *F. S. Collins*, nos. 2621, 2960; No Bottom Pond, Brewster, *Fernald*, no. 18,028; Sparrow Young's Pond, Chatham,

Fernald, no. 16,318; Provincetown, *Fernald & Long*, no. 18,029; Nantucket, July 7, 1885, *Redfield;* Springfield, August 20, 1903, *L. Andrews;* Monterey, July 12, 1912, *R. Hoffmann.* RHODE ISLAND: Cumberland, May 30, 1911, *R. A. Ware;* without statement of locality, *Olney.* CONNECTICUT: Lake Quassapaug, Middlebury, *Blewitt*, no. 1469; Southington, *L. Andrews*, no. 714; Waterbury, *Blewitt*, no. 491. NEW YORK: Lake Ronkonkoma, Long Island, *Ferguson*, nos. 2292, 5037; Big Long Pond, Sag Harbor, Long I., *Ferguson*, no. 5822; Kellis Pond, Bridgehampton, Long I., *Ferguson*, nos. 3930, 4902; Meadowbrook, Long I., *Ferguson*, no. 437; Winfield, Long I., *Ferguson*, no. 4952; New Dorp, Staten I., July 7, 1889, *Britton;* lake above Catskill Mt. House, Catskill Mts., July 15, 1893, *Shear;* Skinner's Creek, Sandy Creek Township, *Fernald, Wiegand & Eames*, no. 14,185. NEW JERSEY: New Egypt Pond, *J. H. Grove*, no. 570½; Manahawken, July 22, 1907, *Long;* Delanco, August 17, 1907, *Van Pelt;* southwest of Clementon, June 12, 1864, *C. E. Smith;* Wildwood, September 10, 1909, *O. H. Brown.* PENNSYLVANIA: Pike Co., July 9–15, 1899, *Brown & Saunders;* Lily Lake, Luzerne Co., August 16, 1889, *Heller, Small;* Mount Bethel, September 2, 1907, *Long;* Rock Hill, June 21, 1908, *Van Pelt;* Byberry, 1866, *Martindale;* Wellsboro, July 7, 1869, *Garber;* Harnsburg, September, 1893, *Small* (TYPE); Safe Harbor, June 23, 1864 (coarse form), July 6, 1866 (slender form), *Porter;* McCall's Ferry, September 26, 1891, *Small* (one of original collections), July 1 and 3, 1904, *Crawford.* DELAWARE: Wilmington, June 25, 1897, *Commons.* MICHIGAN: Jackson, July 15, 1894, *S. H. Camp.* INDIANA: Goose Lake, Whitley Co., *Deam*, no. 31,222; Wahob Lake near Valparaiso, August 16, 1920, *Peattie;* Kankakee River, Thayer, *Deam*, no. 20,128; northwest of Grayville, *Deam*, no. 25,694. WISCONSIN: Sauk Co., 1861, *Hale.* ILLINOIS: near Wady Petra, *V. H. Chase*, nos. 614, 1450; Oquawka, June, 1873, *Patterson.* IOWA: Missouri Valley, *Pammel*, no. 418; Armstrong, June 29, 1897, *Cratty.* MISSOURI: St. Louis, May, 1845, *Engelmann;* Courtney, *Bush*, no. 2997; Webb City, *E. J. Palmer*, no. 2168; near Asbury, *E. J. Palmer*, no. 34,662; Emma, 1897, *Demetrio.* NEBRASKA: Dismal River, south of Thedford, *Rydberg*, no. 1485.

Eleocharis Smallii is quite as common as and often more abundant than *E. palustris* in the silicious and peaty soils of the eastern United States, reaching Canada only in the southwestern corners of Nova Scotia and New Brunswick, where it is associated with other southern species. It varies greatly in size, the coarse plants (FIGS. 8 and 9), such as were originally described by Britton, approaching the larger extremes of *E. palustris*, the slender extremes (FIGS. 10 and 11) being as small as *E. calva*. The culms are more firm and wiry than in our other species (in this character differing from *E. mamil-*

lata of western North America, which has softer and flattened culms but similar, though larger, achenes and tubercles). The fertile scales of the spikelet are remarkably narrow and tapering ordinarily to long acute tips; and most commonly the scales are pale except for the two dark and converging lines. In some extremes, as in the type-material, the spikelet is very slender and with appressed-ascending scales; in the opposite extreme (especially in slender plants) the spikelet is plump and the tips of the scales are free and not appressed. All attempts to separate these two extremes have thus far been futile, although the more slender and lower plants have slightly smaller achenes (Fig. 11).

3. E. MAMILLATA Lindb. fil. Acta Soc. Faun. Fl. Fenn. xxiii. no. 7: 7 (1902) and in Dörfler, Herb. Norm. no. 4383 (1902), as *Helcocharis*. *Scirpus* (*Heleocharis*) *mamillatus* Lindb. fil. Acta Soc. Faun. Fl. Fenn. xxiii. no. 7: 4, 7, t. I. figs. 1–18 (1902). *E. macrostachya* Britton in Small, Fl. SE. U. S. 184, 1327 (1903).—Resembling *E. palustris;* but with *soft compressed culms* (becoming very flat and ribbon-like under pressure), 0.2–1.2 m. high: *sheaths drab or pale brown,* usually red only at base: spikelets slenderly subcylindric to lanceolate, commonly tapering or acuminate above, 1–3 cm. long, 2–5 mm. thick at base: lower sterile scales 2 or 3, oblong or narrowly ovate: *fertile scales very numerous,* membranaceous, *pale-brown to purplish,* narrowly ovate, obtuse to subacute, appressed; the lower and median 2–4 mm. long: anthers 1.3–2 mm. long: *achene yellowish or pale-brown, obovoid,* 1.2–1.6 mm. long: bristles 5 or 6 (rarely 8), very delicate, often overtopping the tubercle, rarely wanting: *tubercle depressed-deltoid or umbonate,* as broad as high, sessile or essentially so. Figs. 27–30.—Marshes, swales, ditches and wet shores, Illinois to British Columbia, south to Louisiana, Texas, Michoacan and southern California; Eurasia. Illinois: Athens, Menard Co., *E. Hall,* as *E. compressa;* Salem, Marion Co., 1860, *Bebb;* St. Clair Co., June 4, 1878, *Eggert.* Missouri: St. Louis, July, 1846, *G. Engelmann,* as *E. compressa;* Buckner, *Bush,* no. 6780; Emma, June 25, 1897, *Demetrio;* Sibley, *Bush,* no. 4011; Kansas City, *Bush,* no. 1748; Prosperity, *E. J. Palmer,* no. 2149. Louisiana: Opelousas, *Carpenter;* "the commonest species in ditches," New Orleans, *Cocks,* no. 1555. North Dakota: Leeds, *Lunell,* no. 7. Nebraska: Red Cloud, *J. M. Bates,* no. 2933. Kansas: Riley Co., *J. B. Norton,* no. 546; Dickinson Co., *Hitchcock,* no. 973, as *E. compressa;* Wichita, *S. F. Poole,* no. 140. Oklahoma: without statement of locality, 1868, *Edw. Palmer* (type of *E. macrostachya*); Kenton, *Stevens,* no. 447. Texas: Terrell, Kaufman Co., May 13, 1904, *F. J. Tyler;* Dallas, *Reverchon,* no. 3600; Devil's River, Valverde Co., July 12, 1849, *C. Wright,* no. 712. Idaho: Falk's Store, Canyon Co., *Mac-*

bride, no. 221. CALIFORNIA: Russian River, Mendocino Co., *Heller*, no. 5828; Shelter Cove, Humboldt Co., *Kellogg & Harford*, no. 1061; Chico, *Copeland*, no. 3182; Calaveras River, *E. E. Stanford*, no. 434; Yosemite Valley, *Abrams*, no. 4632; Santa Barbara, *Rothrock*, no. 155; San Bernardino, *Parish*, nos. 1185, 1186. WASHINGTON: Toppenish, Yakima Co., *Cotton*, no. 788; New London, Chehalis Co., *Lamb*, no. 1201. BRITISH COLUMBIA: Lake House, Skagit River, *J. M. Macoun*, no. 78,193; Depot Creek, Chilliwack Lake, *Spreadborough*, no. 78,192; east of Chilliwack Lake, *J. M. Macoun*, no. 34,773; vicinity of Nanaimo, *J. Macoun*, no. 78,800; Renfrew, *Rosendahl & Butters*, no. 87. DURANGO: vicinity of city of Durango, 1896, *Edw. Palmer*, no. 387. SAN LUIS POTOSI: "in paludosis circa urbem," *Schaffner*, no. 576. MICHOACAN: Rincon, *G. Arsène*, no. 2794, as *E. rostellata*.

Eleocharis mamillata is best distinguished by its very soft and flat or compressed culms and its small achenes with low and broad tubercle. It was presumably included by Linnaeus under his *Scirpus palustris*, but since Lindberg has set off the plant with soft culms and low tubercles, leaving to stand for *E. palustris* the plant with subterete and firmer culms and elongate bulbiform tubercles, it seems wisest to accept this differentiation. As recognized by Lindberg *E. mamillata* was known to be of general dispersal over northern Europe; in the Gray Herbarium it is represented from as far south as Saxony and some Japanese plants (immature) seem to belong to it. In North America the species belongs in the lower altitudes from the Mississippi basin into Mexico and along the Pacific slope north to southern British Columbia. Lindberg's figures of the achenes of the Scandinavian and Finnish plant are perfectly matched by the achenes of American specimens of *E. macrostachya* and authentic specimens of *E. mamillata* (FIGS. 27 and 28) are closely matched by characteristic American sheets (FIGS. 29 and 30) of *E. macrostachya:* the sheet of Lindberg's original distribution, no. 4383 of Dörfler's *Herbarium Normale*, later material collected by Lindberg and distributed as no. 158 in Kneucker's *Cyperaceae et Juncaceae exsiccatae*, as well as Swedish material from Elias Fries and from Hülphers are so close to American specimens that I can find no satisfactory reason to separate the Eurasian and American plants. Some American sheets which are closest matches for European are *Eggert*, St. Clair Co., Illinois; *E. J. Palmer*, no. 2149; *Cocks*, no. 1555; *Stevens*, no. 447; *Lamb*, no. 1201; *J. M. Macoun*, no. 34,773; *J. Macoun*, no. 78,800. These are all plants with dark scales and

full spikelets; but I am unable to get any satisfactory distinctions between these specimens and others from the Mississippi basin westward with more slender spikelets or with paler scales.

4. E. CALVA Torr. Fl. N. Y. ii. 346 (1843). *Scirpus glaucus* Torr. Fl. No. and Mid. U. S. 44 (1824), not *E. glauca* Boeckl. (1871). *E. palustris*, var. *calva* (Torr.) Gray, Man. 522 (1848). *E. palustris*, var. *glaucescens* of many Am. auth., not *Scirpus glaucescens* Willd. (1809). *Trichophyllum palustre*, var. *calvum* (Torr.) Farwell, Rep. Mich. Acad. Sci. xxi. 358 (1920).—Loosely stoloniferous to slightly cespitose, with capillary or slender rhizomes and stolons: *culms* 1–6.5 dm. high, *nearly filiform*, 0.5–1.5 mm. in diameter at the summit of the upper sheath, *terete* or corrugated, rarely compressed: *sheaths red or castaneous, very close;* the upper 0.2–1 dm. long, 0.7–1.5 mm. in diameter: *spikelet* linear-lanceolate or slenderly ovoid, 0.9–1.7 cm. long, 1.5–4 mm. thick, *closely many-flowered: basal scale orbicular to round-ovate, spathiform, completely encircling the bases of the lower fertile scales: fertile scales* oblong to ovate, *mostly obtuse, thin and membranaceous, reddish to pale brown, opaque, closely appressed; the lower and median 1.8–3 mm. long:* anthers 1.3–1.7 mm. long: *achenes* pyriform or narrowly obovoid, yellowish to castaneous, *1–1.4 mm. long*, 0.7–1 mm. broad: *tubercle conical, 0.2–0.45 mm. broad at base:* perianth wanting or of 1–4 delicate bristles usually equaling or slightly exceeding the tubercle. FIGS. 15 and 16.—Wet shores, bogs or springy spots, Quebec to Alberta and Washington, south to Florida, Oklahoma and northern Mexico; also Hawaii and eastern Asia. The following, selected from many specimens, are characteristic. QUEBEC: Rivière Ashuapmouchouan, Baie de St.-Prime, Lac St.-Jean, *Victorin*, no. 15,113; Pointe-Plate, près de Roberval, *Victorin*, no. 15,115; vicinity of Cap a l'Aigle, *J. Macoun*, no. 69,302; Lanoraie, *Svenson & Fassett*, no. 1031; shores of Caughnawaga, *Victorin*, no. 8115; Isle-aux-noix, Richelieu River, *Victorin*, no. 8116; beach of St. Lawrence River, Lachine, August 15, 1912, *Churchill;* Cascades environs d'Ottawa, *Victorin*, no. 10,284; Aylmer, *Malte*, no. 119,807; Caribou Hill, Black Lake, *Fernald & Jackson*, no. 12,031. NEW BRUNSWICK: Tidehead near Campellton, *Malte*, no. 119,813; St. Leonard, *W. R. Watson*, nos. 119,816, 119,817; tidal shores of the St. John, Upper Greenwich and Westfield, *Fassett*, nos. 2190, 2189. NOVA SCOTIA: McDonald's Barren, Northeast Margaree, Cape Breton, *C. B. Robinson*, no. 345. MAINE: Van Buren, September 11, 1896, *Fernald;* Old Town, July 16, 1892, *Fernald;* Orono, July 19, 1890, *Fernald;* Kennebec River, Fairfield, *Fernald & Long*, no. 12,799. NEW HAMPSHIRE: Connecticut River, Northumberland, *Pease*, no. 12,172; Enfield Lake, July 28, 1890, *Kennedy;* Connecticut River, Walpole, July 28, 1901, *Williams*. VERMONT: Knight's Island, Lake Champlain, July 12, 1899, *Brainerd;* L. Champlain, Burlington, *Blake*, no. 2076; Queeche Gulf, Woodstock, July 4, 1910, *Kennedy;*

Salem, July 22, 1914, *Churchill;* Manchester, *Day*, no. 240. MASSACHUSETTS: Glendale, August 10, 1904, *Hoffmann*. CONNECTICUT: Hartford, July 7, 1884, *C. Wright*. NEW YORK: Narrows Island, Black Lake, *Fernald, Wiegand & Eames*, no. 14,184; Blake Lake, Morristown, *Phelps*, no. 180; Sylvan Beach, Oneida Lake, September 4, 1906, *Rowen;* Slayton Pond, Conquest, *Wiegand*, no. 5913; marl ponds, Springport, *Eames*, no. 9332; North Spring, Union Springs, *Wiegand, Fernald & Eames*, no. 14,591; Enfield, *E. L. Palmer*, no. 184. NEW JERSEY: Palisades at Creskill, *Dautun*, no. 17; Milburn, June 24, 1894, *Livingston;* Hewett's Pond, north of Andover, July 2, 1907, *Brown & Van Pelt;* Newton, July 4, 1907, *Carter;* Cold Spring, Cape May County, May 27, 1906, *Van Pelt;* Peermont, Cape May County, June 14, 1908, *Van Pelt*. PENNSYLVANIA: on the Delaware and the Bushkill, Easton, many collections, *Porter;* Mount Bethel, June 28, 1908, *Bartram;* Wilt's Mill meadows along Trout Creek, Allentown, *Pretz*, nos. 485, 4702, 4780; meadow southwest of Trexlertown, *Pretz*, no. 5908; near old Lewis' Furnace, Allentown, July 5, 1912, *Hamm*, no. 1095; Rocky Island in Schuylkill River, West Manayunk, *MacElwee*, no. 556; Green Lane, June 21, 1905, *Van Pelt;* Embreeville, August 9, 1884, *Seal;* West Chester, *Pennell*, no. 372; Susquehanna River, York Furnace, *MacElwee*, no. 225; Safe Harbor, July 6, 1866, *Porter;* Ararat, July, 1900, *Saunders;* Ohio Pyle, *Brown, Crawford & Van Pelt*, no. 52. DELAWARE: Greenbank, August 13, 1879, *Commons*. MARYLAND: river-bed, Conowingo, *Pennell*, no. 1572. VIRGINIA: Wytheville, 1874, *Shriver;* northeast of Williamsburg, *Grimes*, no. 3708. SOUTH CAROLINA: Gough, *J. St. Clair White*. FLORIDA: without locality, *Chapman*. ONTARIO: Moose Factory, James Bay, 1882, *W. Haydon;* Rockliffe, Ottawa, *Malte*, no. 119,803; Port Colborne, *J. Macoun*, no. 34,487; Amer, *J. Macoun*, no. 34,486; Galt, July 15, 1903, *Herriot*. OHIO: Cedar Point, Erie County, June 26, 1897, *Moseley;* Shalersville, Portage County, June 15, 1909, *Webb;* Columbus, 1839, *Sullivant*. INDIANA: Greencastle, June, 1893, *Underwood*. MICHIGAN: Alma, June 23, 1893, *C. A. Davis;* Chatham, 1902, *L. M. Geismar*. WISCONSIN: Oronto, July 30, 1868, *Gilman;* Green Bay, June 22, 1882, *Schuette;* Lake Michigan Beach, Racine, *Wadmond*, no. 3137. ILLINOIS: Stony Island, Cook County, *H. H. Smith*, no. 5931; Illinois River bottom, July and August, 1903 and 1904, *McDonald* (distributed as *E. intermedia*); Urbana, June 27, 1900, *Gleason*. TENNESSEE: along Cumberland River, Nashville, June, 1894, *Bicknell*. MANITOBA: Grand Beach, Lake Winnipeg, *Malte*, nos. 106,697, 106,700; Brandon, *J. Macoun*, no. 16,374. MINNESOTA: Mississippi River, Fort Snelling, *Means*, no. 693. IOWA: Clinton City, *G. D. Butler*, no. 18; Fort Dodge, *M. P. Somes*, no. 111; Iowa City, June 20, 1907, *Somes*. MISSOURI: Webb City, *E. J. Palmer*, no. 2169; London, *Lansing*, no. 2947. ARKANSAS: northwestern Arkansas, *Harvey*, nos. 7 and 36. NORTH DAKOTA: Devil's Lake, 1839, *Nicolet;* wet soil,

Leeds, June 19, 1906, *Lunell;* Butte, July 29, 1906, *Lunell;* Dickinson, August 19, 1908, *Holgate*. South Dakota: Sioux Falls, June 5, 1896, *T. A. Williams;* Lead City, *Rydberg*, no. 1074. Nebraska: low lands of the Missouri, northeastern Nebraska, *F. Clements*, no. 2552; Ashland, *T. A. Williams*. Kansas: Pottawatomie County, *Norton*, no. 547; Cheyenne County, *Hitchcock*, no. 1051a. Oklahoma: Sellard's Pond, near Alva, *Stevens*, no. 251; Beaver County, *Stevens*, no. 372. Saskatchewan: Eagle Creek, *J. Macoun*, no. 73,078; near Prince Albert, *J. Macoun*, no. 16,376. Alberta: Red Deer River, vicinity of Rosedale, *Moodie*, no. 890. Montana: Sinyale-a-min Lake, *MacDougal*, no. 373; Bozeman, August 23, 1905, *Blankinship*. Wyoming: Laramie, *Nelson*, no. 289; Lower Falls of the Yellowstone, July 26, 1871, *Hayden*. Colorado: Delta, *Tidestrom*, no. 1509; Denver, May, 1881, *B. H. Smith*. Utah: Farmington, June 17, 1908, *Mrs. Joseph Clemens;* Teller's Flat, Fish Lake, *Tidestrom*, no. 1845. Nevada: along ditches, Caliente, *Tidestrom*, no. 9473 as *E. montana*. New Mexico: Santa Fé Creek, *A. A. & E. G. Heller*, no. 3809. Arizona: Camp Grant, alt. 4753 ft., *Rothrock*, no. 380. Mexico: San Luis Potosi, 1878, *Parry & Palmer*, no. 913. Washington: junction of Crab and Wilson Creeks, Douglas County, *Sandberg & Leiberg*, no. 323; Prosser, Yakima County, *Cotton*, no. 660; Grand Coulee, *Griffith & Cotton*, no. 446. Hawaii: Oahu, *U. S. Pac. Expl. Exped.* Eastern Asia: Amur, *Maximowicz;* central Amur, 1891, *Korshnisky;* Amur River, Manchuria, 1855, *Maack*, no. 524.

Eleocharis calva is the inland plant which has usually passed as *E. palustris* var. *glaucescens* or as *E. glaucescens;* but, as explained in the discussion of *E. uniglumis*, *E. glaucescens* rests upon *Scirpus glaucescens* Willd., which is merely a form of *E. palustris*. The only plant besides *E. uniglumis* (Figs. 31 and 17–26) with which *E. calva* (Figs. 15 and 16) is likely to be confused is the most slender extreme of *E. palustris* (Figs. 1–4) but that has 2 or 3 basal scales and much longer, sharper and less appressed fertile ones and larger achenes and long tubercle. The eastern Asiatic specimens cited seem quite like ours but fuller material may show that the two are not identical.

5. **E. perlonga**, n. sp., caespitosa; culmis 1.5–3.5 dm. altis teretibus vel subteretibus 1–3 mm. diametro; vaginis artis 2–5.5 cm. longis 1.5–3.5 mm. diametro ad basin brunnescentibus; spicula linearicylindrica 2.5–4 cm. longa 2.5–5 mm. crassa dense multiflora; squama inferiori spathiformi ovata 2.5–3 mm. longa coriacea; squamis fertilibus membranaceis lanceolatis vel anguste ovatis obtusis vel subacutis, imis mediisque 4–5 mm. longis margine late hyalinis; antheris 2 mm. longis; achaeniis subglobosis vel late obovoideis olivaceobrunneis 1.4 mm. longis 1.1 mm. latis; tuberculo conico ad basin

0.45 mm. lato; setis 2–4 delicatulis tuberculum vix aequantibus. FIGS. 12–14.—CALIFORNIA: Aqua Fria Cañon, Mariposa County, June 20, 1897, *J. W. Congdon*, no. 88 (TYPE in Gray Herb.); vicinity of Ione, Amador County, June, 1904, *E. Braunton*, no. 1058 (herb. N. Y. Bot. Gard.).

Eleocharis perlonga may prove to be an extreme variation of *E. mamillata*, but in its broad and spathiform lower scale it seems to belong to the group with *E. uniglumis*, *E. calva* and *E. xyridiformis*. The material at hand is very inadequate and it is to be hoped that fuller collections can be made.

Another plant of which very inadequate material is at hand is represented only by over-ripe culms (without caudex). This plant (*Burtt Davy*, no. 3288), from wet, adobe meadows, Honey Lake Valley, Lassen County, California, strikingly resembles the most slender extreme (FIGS. 10 and 11) of the eastern *E. Smallii* and its bruised spikelets seem to have 2 or 3 basal sterile scales. Its achenes and tubercles are scarcely separable from those of *E. perlonga*. Fuller and slightly younger material may show it worthy special designation; it is likewise possible that it may be a very slender *E. palustris*, var. *typica*.

6. E. UNIGLUMIS (Link) Schultes, Mant. ii. 88 (1824). *Scirpus uniglumis* Link, Jahrb. d. Gew. i^3: 77 (1820). *Clavula uniglumis* (Link) Dumort. Fl. Belg. 143 (1827). *E. affinis* C. A. Meyer, Beitr. z. Pflanzenk. Russ. Reich. viii. 261 (1851). *E. Watsoni* Bab. Ann. Mag. Nat. Hist. ser. 2, x. 20 (1852). *Scirpus paluster*, subsp. *S. uniglumis* (Link) Aschers. & Graebn. Syn. Mitteleur. Fl. ii. ab. 2: 291 (1904). *S. palustris*, var. *uniglumis* (Link) Junge, Jahrb. Hamburg. Wissenschaftl. Anstalt. xxv. Beih. 3: 248 (1908).—Loosely stoloniferous or cespitose, with the rhizomes and stolons capillary or very slender: *culms* 0.3–7 dm. high, 0.3–3 mm. in diameter at the summit of the upper sheath, *terete* or corrugated, rarely subcompressed: sheaths mostly reddish at least at base, close; the upper 0.8–8.5 cm. long: *spikelets* lanceolate to slenderly ovoid, 0.3–1.7 cm. long, 2–6 mm. thick, *loosely 5–30-flowered: basal scale orbicular or round-ovate, spathiform, completely clasping the base of the spikelet, castaneous*, with pale scarious margin: *fertile scales oblong-ovate, obtuse to subacute, commonly castaneous or purplish, subcoriaceous to firm-membranaceous, lustrous; the lower and median 3–5 mm. long:* anthers 1.5–2.2 mm. long: *achenes* obovoid, pyriform or somewhat ellipsoid, yellowish to dark brown or olive, *1.2–1.8 mm. long*, 1–1.4 mm. broad: tubercle from depressed-deltoid to conic-ovoid or lanceolate, 0.2–1 mm. broad at base: bristles wanting or very delicate and short or sometimes elongate but scarcely overtopping the tubercle. FIGS. 31 and 17–26.

A variable circumpolar species with two somewhat marked varieties with us:

Achenes ellipsoid to narrowly obovoid: the tubercle depressed-deltoid to low-conical, often as broad as high, 0.6–1 mm. broad at base, covering ½–¾ the breadth of the achene.....Var. *typica*.
Achenes broadly obovoid or pyriform: tubercle bulbiform, slenderly conical to lanceolate, commonly higher than broad, 0.2–0.5 mm. broad at base, covering ⅙–rarely ½ the breadth of the achene.....Var. *halophila*.

Var. **typica**. *Scirpus uniglumis* Link, l. c. (1820). *E. uniglumis* (Link) Schultes, l. c. (1824). Fig. 31.—Basic, calcareous or alkaline shores and marshes, Labrador to British Columbia, south locally along the coast to Rhode Island and inland to North Dakota, Wyoming and Oregon; Greenland and Eurasia. The following American collections are referred here. Labrador: brackish margin of Paradise River, Sandwich Bay, *H. Bishop*. Newfoundland: small pools on diorite tableland, alt. 550 m., Blomidon Mts., *Fernald & Wiegand*, no. 2706. Quebec: brackish shore, Chevalier, *St. John*, no. 90,179; tidal mud at mouth of River Shécatica, Brouague, *St. John*, no. 90,180; estuary of R. Etamaniou, Charnay, *St. John*, no. 90,181; sables près de l'embouchure, R. Romaine, *Victorin & Rolland*, no. 20,165; Murray River, *J. Macoun*, no. 69,301; vicinity of Cap à l'Aigle, *J. Macoun*, no. 69,301. Massachusetts: peaty margin of Sheep Pond, Cuttyhunk, *Fogg*, no. 2526. Rhode Island: damp sandy shore of Wash Pond, Block Island, *Fernald, Hunnewell & Long*, no. 8887. Hudson Bay: without definite statement of locality, *Burke*. Manitoba: boggy place, Brandon, *J. Macoun*, no. 16,374. North Dakota: St. Mary's Lake, *Mabbott*, no. 225. Saskatchewan: Crane Lake, *J. Macoun*, no. 7551, as *E. acuminata;* Long Lake, July 6, 7, 8, 1879, *J. Macoun*, nos. 5, 50, 300; muskeag north of Prince Albert, *J. Macoun*, no. 16,377 in part (as *E. tenuis*). Wyoming: wet alkali soil, Point of Rocks, *Merrill & Wilcox*, no. 708. Oregon: Alkali Lake, Klamath Co., *Applegate*, no. 843; junction of Crab and Wilson's Creeks, Douglas Co., *Sandberg & Leiberg*, no. 323. Washington: Westport, Chehalis Co., *F. H. Lamb*, no. 1103. British Columbia: beach, Alberni Canal, *Rosendahl*, no. 1922; seashore, Point Grey, June, 1898, *R. B. Dixon*.

Var. **halophila**, n. var., achaeniis late obovoideis vel pyriformibus; tuberculo conico vel lanceolato ad basin 0.2–0.5 mm. lato. Figs. 17–26.—Saline and brackish shores, southern Newfoundland and south shore of the St. Lawrence to Delaware; also central New York. The following are typical. Newfoundland: brackish estuary at the Narrows, Port à Port, July 25, 1921, *Mackenzie & Griscom*, no. 10,106; border of brackish pool, Stephenville Crossing, August 14, 1910, *Fernald, Wiegand & Kittredge*, no. 2705; marsh on coast, Bay St. George, August 12, 1908, *Eames & Godfrey*, no. 5884; brackish sand back of Sand Bank, west of Burgeo, September 9,

1926, *Fernald, Long & Fogg,* no. 109. St. Pierre et Miquelon: marécages, Plaine de Miquelon, 22 juillet, 1901, *Arsène,* no. 86. Quebec: brackish shores about mouth of Dartmouth River, August 26 and 27, 1904, *Collins, Fernald & Pease;* platières du delta de la Rivière York, July 16, 1923, *Victorin et al.,* no. 17,060; brackish marshes at mouth of Bonaventure River, August 2–4, 1904, *Collins, Fernald & Pease* (type in Gray Herb.); border of salt marsh, Capucins, July 28, 1922, *Fernald & Pease,* no. 24,914; Anse à Persil, Rivière du Loup, July, 1913, *Victorin,* no. 104. Magdalen Islands: wet brackish sand, Étang du Nord, Grindstone Island, July 24, 1912, *Fernald, Bartram, Long & St. John,* no. 6959; sable humide de la dune, Ile du Hâvre-au-Ber, *Victorin & Rolland,* no. 9358; margins of small ponds among the sand hills, Pointe du Loup, July 21, 1912, *Fernald, Bartram, Long & St. John,* no. 6957; étangs sablonneux, Grand Étangs, Ile de la Grande-Entrée, August 1, 1919, *Victorin & Rolland,* no. 9347; étangs sur la dune, Ile Brion, August 4, 1919, *Victorin & Rolland,* no. 9349. Prince Edward Island: salt marsh, Green's Shore, Summerside, July 21, 1912, *Fernald & St. John,* no. 6955; shore of Cozen's Pond, August 29, 1912, *Fernald, Long & St. John,* no. 6958; boggy ground, Brackley Point, June 28, 1888, *J. Macoun,* no. 32,199; dune-hollows, Brackley Point, August 31, 1912, *Fernald, Long & St. John,* no. 6960. New Brunswick: shore of bay, Bathurst, August 16, 1913, *Blake,* no. 5452; salt meadow, Shediac Cape, August 7, 1916, *Hubbard;* brackish meadow, Whitehead Island, Charlotte County, August 5, 1926, *C. A. & U. F. Weatherby,* no. 5501. Nova Scotia: Sable Island, *J. Macoun,* nos. 22,640, 22,647, 77,185–77,187; *St. John,* nos. 1153–1155; damp sand-flats back of beach, Villagedale, August 7, 1920, *Fernald, Long & Linder,* no. 20,147; brackish muddy and gravelly margin of Eel Lake, July 27, 1920, *Fernald, Bean & White,* no. 20,145. Maine: shallow water between the heath and the salt marsh, base of West Quoddy Head, Lubec, July 26, 1909, *Fernald,* no. 1385; brackish marsh, Baker's Island, July 15, 1898, *Rand;* boggy meadow, Swan's Island Head, Swan's Island, July 22, 1913, *Hill,* no. 735; pool in rocks, Thunder Gulch, Isle au Haut, July 21, 1921, *Kidder;* brookside, Matinicus, July 18, 1921, *C. A. E. Long;* brackish pool, Outer Heron Island, Boothbay, August 30, 1922, *Fassett,* no. 434; among tall grass, Wells Beach, July 23, 1898, *Fernald.* New Hampshire: Hampton Falls, August 11, 1897, *A. A. Eaton.* Massachusetts: Oak Island, July 9, 1882, *Young;* salt marsh, Neponset River Reservation, June 14, 1920, *Kidder;* salt marsh, Fairhaven, July 15, 1904, *Hervey;* Woods Hole, July 20, 1911, *Pennell,* no. 3009; fresh to brackish springy border of Dinah's Pond, Yarmouth, August 16, 1919, *Fernald & Long,* no. 18,022; salt marsh, Doane Creek, Harwich, July 6, 1918, *Fernald,* no. 16,319; springy border of salt marsh, Red River, Chatham, August 8, 1919, *Fernald & Long,* no. 18,027; sandy shore of Tashmoo Lake, Tisbury, September 5, 1917, *Seymour,* no. 1496;

sandy pond-margin, French Watering Place, Naushon, July 14, 1925, *Fogg*, no. 1028; Madsquecham Pond, Nantucket, September 2, 1904, *Bicknell*. Rhode Island: border of brackish pool, Westerly, August 31, 1919, *Weatherby & Collins;* dune-hollows between Chagum Pond and Wash Pond, Block Island, August 22, 1913, *Fernald, Hunnewell & Long*, no. 8889. Connecticut: salt marsh, Orange, June 20, 1899, *Bissell*. New York: salt marshes, Long Island, *Wm. Darlington;* brackish marsh, Southampton, August 2 and 3, 1920, *St. John*, no. 2598; brackish sandy shore, Great Pond, Montauk, July 7, 1923 and August 8, 1924, *Ferguson*, nos. 2603, 3168; Coney Island, July 4, 1893, *Thos. Seal;* salty spots in meadows northeast of Montezuma Village, Cayuga County, June 25, 1919, *Wiegand, Eames & Randolph*, no. 11,428. New Jersey: shore of Newark Bay, Bergen Point, June 18, 1893, *Thos. Seal;* Deal, August 6, 1866, *A. H. Smith;* Long Beach, June, 1848, *Bischoff;* south of Maxon's Pond, Point Pleasant, July 7, 1910, *Van Pelt & Brown*, no. 277; salt meadows, Atlantic County, July, 1873, *Seal;* Cold Spring, May 27, 1906, *Van Pelt;* marsh toward the Bay shore, Dias Creek, August 11, 1903, *Long*. (The material from Cape May is not quite typical, having unusually depressed tubercles and a tendency toward two instead of a single basal scale, thus approaching *E. Smallii*). Delaware: marshes near Slaughter Beach, July 16, 1896, *Commons;* salt marshes and moist places in sand-dunes, near Cape Henlopen, July 14, 1898, *Commons*.

Eleocharis uniglumis is one of the plants which has been passing in America as *E. palustris*, var. *glaucescens* (Willd.) Gray or as *E. glaucescens* (Willd.) Schultes. The original description of *Scirpus glaucescens* Willd. Enum. Pl. Hort. Berol. 76 (1809) calls for a plant with culms a foot-and-a-half or more in height, the basal sheaths loose, the styles trifid. In studying Willdenow's herbarium Asa Gray made the manuscript memorandum: "*glaucescens!* (spec. cult. but very poor) nothing to do with *S. tenuis*, but certainly *S. palustris!* I wonder Kunth did not find it out. Pretty large and stout, with more slender younger culms, barren intermixed"; and at the same time he noted that *S. uniglumis* "looks good." One of the few old sheets in the Gray Herbarium bears Gray's determination: *E. uniglumis;* this clearly indicating that at first Gray did not consider it identical with *E. glaucescens*, although in several editions of the *Manual* he so treated it. Ascherson & Graebner consider *E. glaucescens* merely a glaucous form of *E. palustris* and Rouy treats it as a glaucescent subvariety of *E. palustris*.

The more northern material, from the Labrador Peninsula, Hudson Bay and westward seems quite inseparable from the Eurasian

plant, with low and broad tubercle (Fig. 31). Southward along the Atlantic coast var. *halophila* (Figs. 17–26) is commonly well defined, so clearly in most cases that we were at first inclined to consider it a distinct species. Too many collections, however, show tubercles in shape inseparable from those of typical *E. uniglumis* but not quite so broad, these collections making a perplexing transition between the two extremes. Some of the collections from southern New England and from Cape May are particularly difficult to place, since their tubercles so strongly approach those of the usually more boreal *E. uniglumis*, var. *typica*. It is possible that they have some admixture of *E. Smallii*, which has low and broad tubercles.

A plant of the Great Plain region, with cespitose habit, rigid culms and pale scales may eventually be separated from *E. uniglumis*. At present the material at hand is too meagre for confident decision.

On account of its single basal glume *Eleocharis calva* (Figs. 15 and 16) might be mistaken for *E. uniglumis*. In general they are quite distinct and *E. calva* occurs in river-silts and other habitats with neutral or slightly calcareous but not strongly alkaline soil; *E. uniglumis* preferring the more concentrated calcareous or alkaline shores.

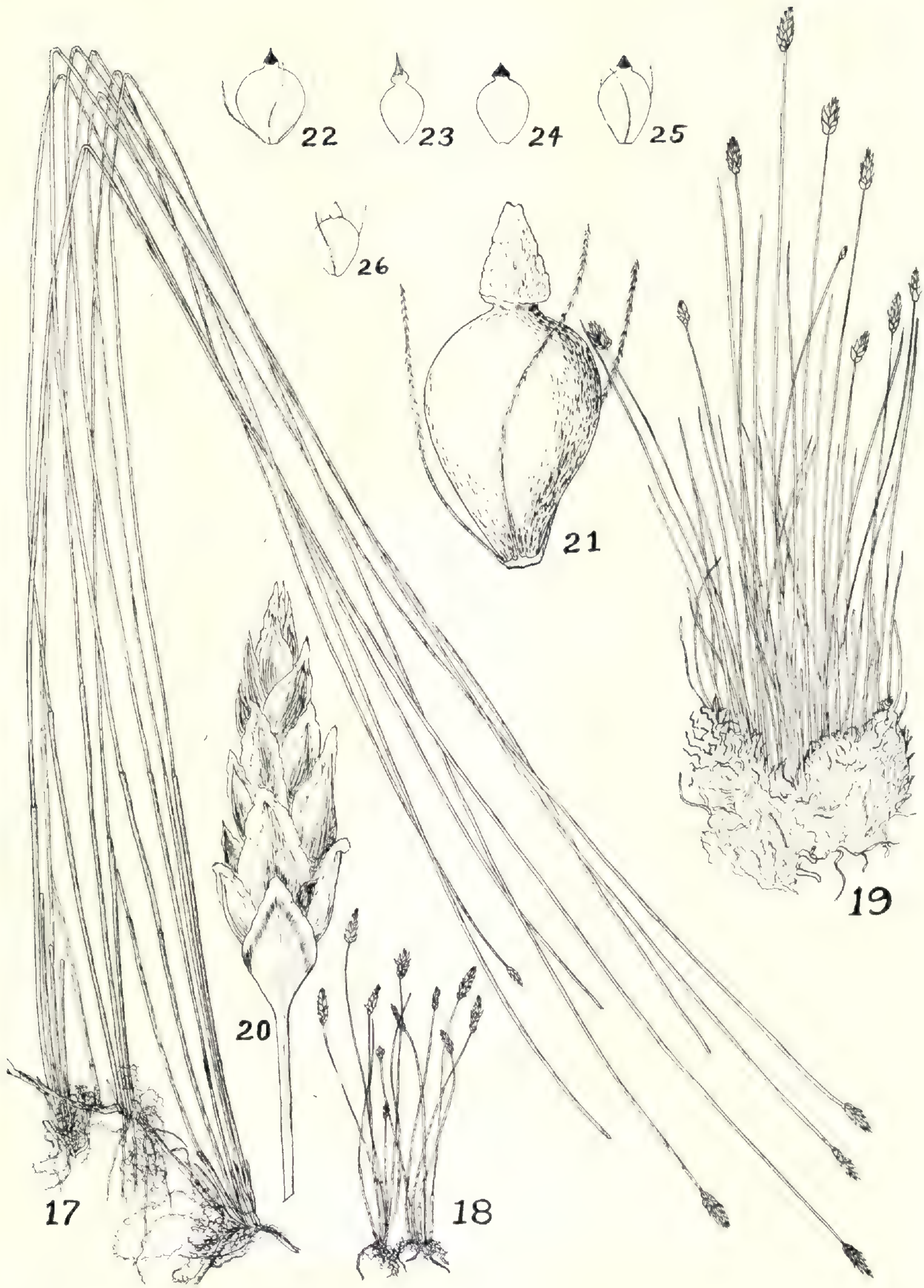
The range of variation of achenes and tubercles of European *Eleocharis uniglumis*, var. *typica* is well displayed in the study by Harald Lindberg, Acta Soc. Faun. Fl. Fenn. xxiii. no. 7, t. II. figs. 36–56; Dr. Svenson's illustration (Fig. 31) accompanying the present paper shows a characteristic achene. The broadly obovoid achene of var. *halophila* strongly suggests that of the Eurasian and western American *E. mamillata*, but the tubercle of thoroughly characteristic var. *halophila* is more like that of *E. palustris*, mostly longer than broad and varying to lance-ovoid or in extremes to lanceolate and the achene is larger than in *E. mamillata*.

7. E. KAMTSCHATICA (C. A. Meyer) Komarov, Fl. Penins. Kamtsch. i. 207 (1927). *Scirpus kamtschaticus* C. A. Meyer, Mém. Acad. Imp. Sc. St. Pétersb. Div. Sav. i. 198, t. 1 (1831). *E. pileata* Gray, Mem. Am. Acad. n. s. vi. 417 (1859), in part. *S. mitratus* Franch. & Savat. Enum. Pl. Jap. ii. 544 (1879). *? S. sachalinensis* Meinsh. Acta Hort. Petrop. xviii. 260 (1901). *E. Savatieri* Clarke in H. Léveillé, Bull. Acad. de Géog. Bot. xiv. 203 (1904), name only, Kew Bull. Add. Ser. viii. 21 (1908) and Ill. Cyp. t. xxxvi. figs. 15–18 (1909).—Loosely stoloniferous: culms tufted, filiform, 0.3–3 dm. high, 0.5–1 mm. in diameter at summit of the upper sheath, terete: sheaths reddish, close; the upper 0.6–8 cm. long: *spikelet* oblong-lanceolate, 4–12 mm. long, 2.5–5 mm. broad, *loosely few-flowered:*

basal scale broadly ovate, completely encircling the bases of the flowering scales, castaneous, with pale scarious margin: *fertile scales* 10–20, broadly ovate, *rounded at tip, castaneous, subcoriaceous; the lower and median about 3 mm. long:* anthers 1.7–2 mm. long: achenes obovoid, 1.3–1.5 mm. long, 1.2 mm. broad, closely capped by the *high narrowly ovoid* spongy-cellular *mitriform blunt tubercle* (*nearly as long as to longer than the achene*): perianth wanting or of 3–6 delicate bristles, sometimes slightly exceeding the achene. Figs. 32 and 33.—Eastern Asia and southern Alaska. The following have been examined from Alaska: mud flats by small lakes near Yes Bay, *Howell*, nos. 1685, 1686; in beaver ponds, Yes Bay, *Gorman*, no. 158. Hultén cites material from Unalashka.

Meyer's *Scirpus kamtschaticus* was based on flowering material, but Hultén, Fl. Kamtch. and Adj. Isl. i. 166 (1927), definitely identifies it with the plant of eastern Asia and Alaska with "stylopodium . . . nearly as big as the achenes" and he further places with it *E. triflora* Komarov in Fedde, Rep. Spec. Nov. xiii. 162 (1914), which he says is merely a small extreme of *E. kamtschatica.* The original sheet in the Gray Herbarium of *E. pileata* Gray is a hopeless mixture: the plants partly *E. palustris* (L.) R. & S., partly *E. japonica* Miquel; but the achenes, specially separated out and preserved in a pocket, are those clearly described by Gray in his account of *E. pileata.* These are quite like those of Howell's Alaskan material (Figs. 32 and 33) which was cited by Clarke as his *E. Savatieri* and they agree perfectly with Clarke's illustration of the latter; they are, likewise, like Hultén's account of the achene and tubercle of *E. kamtschatica.* The description of *Scirpus sachalinensis* Meinsh. is so very similar that we felt little hesitation in placing that species also with *E. kamtschatica.*

8. **E. xyridiformis**, n. sp., rigida; rhizomate nigro indurato; culmis rigidis pallidis 1–5.5 dm. longis valde compressis corrugatisque saepe tortis plerumque in caespitibus parvis remotisque; vaginis artis basi rufescentibus, supremis griseis 1.5–7 cm. longis 1–2 mm. diametro: spicula anguste lanceolata 1–2 cm. longa 2–3.5 mm. crassa dense multiflora; squama inferiori spathiformi orbiculata coriacea straminea 1.5–2.5 mm. diametro margine hyalina; squamis fertilibus ellipticis vel ovatis obtusis vel apice rotundatis subcoriaceis stramineis vel albescentibus brunneo-striatis margine albido-hyalinis, imis mediisque 2–3 mm. longis; antheris 2–2.5 mm. longis; setis 2–6 (vel 0) tuberculo superantibus vel vix aequantibus saepe brevissimis vel nullis; achaeniis obovoideis stramineis deinde subcastaneis 1.2–1.8 mm. longis 1–1.4 mm. latis; tuberculo albido deltoideo vel ovato 0.3–0.5 mm. longo 0.3–0.7 mm. lato. Figs. 34 and 35.—North-



A. E. Brackett del.

ELEOCHARIS UNIGLUMIS, VAR. HALOPHILA

27

28

30

29

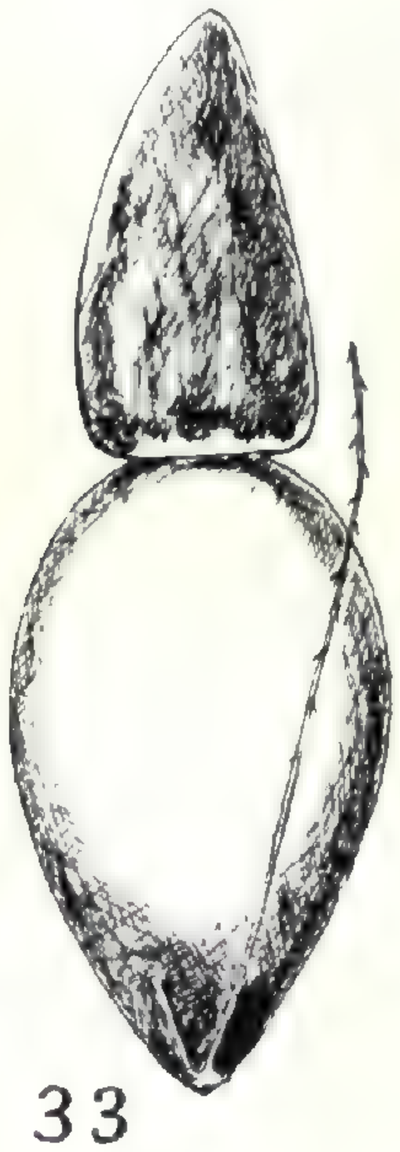
31

34

35

32

32a


33

H. K. Svenson del.

Eleocharis

Figs. 27–30, E. mamillata; 31, E. uniglumis; 32 and 33, E. kamtschatica; 34 and 35, E. xyridiformis.

central Kansas to Nevada, south to the states of Mexico and Jalisco. KANSAS: moist places near Osborne City, May 12, 1894, *Shear*, no. 27. TEXAS: prairies of the Piedra Pinta, Kinney Co., July 3, 1849, *C. Wright*, no. 710. NEW MEXICO: without indication of locality, 1851–52, *Wright*. NEVADA: Muddy River, St. Thomas, 1877, *E. Palmer*, no. 467. ARIZONA: vicinity of Flagstaff, July 12, 1898, *MacDougal*, no. 270; Moenkopi Wash, Painted Desert, July, 1920, *Clute*, no. 125; Spatterbone Lake, Mohave Co., May 15, 1903, *C. F. Wheeler*. DURANGO: vicinity of city of Durango, 1896, *E. Palmer*, no. 187. QUERETARO: Queretaro, 1912, *Frère Basile*, no. 191. MEXICO: Valley of Mexico, May 7, 1898, *Pringle*, no. 6817 (TYPE in Gray Herb.). JALISCO: marshes of the Rio Grande de Santiago near Atequiza, May 20, 1890, *Pringle*, no. 3125.

Eleocharis xyridiformis, on account of its flattened culms, is likely to be confused with *E. mamillata* (FIGS. 27–30), which, like *E. xyridiformis*, is characteristic of the region west of the Mississippi and southward into Mexico. Its very rigid culms ordinarily distinguish *E. xyridiformis*, for the culms of *E. mamillata* are soft and unresistant. In most well developed spikelets the basal scale of *E. xyridiformis* is clearly spathiform, though there is a slight departure from this character; and in *E. mamillata* the basal scales are usually 2 or 3, though rarely only one. In the latter species the spikelet is commonly longer, with merely obtuse or subacute purple-tinged membranaceous fertile scales; in *E. xyridiformis* the shorter spikelets have more rounded and paler scales. The achenes of *E. mamillata* are usually yellowish and the tubercle more depressed, the achene of *E. xyridiformis* quickly becoming dark-brown. Judging from the range, *E. xyridiformis* occurs in more alkaline habitats than *E. mamillata* and its habit suggests a strong xerophytic tendency.

EXPLANATION OF PLATES 181 TO 184.

(Habit × ½; spikelets × 5; achenes, except figs. 22–26, × 20.)

Figs. 1–4, *Eleocharis palustris*, var. *typica;* 5–7, *E. palustris*, var. *major;* 8 and 9, *E. Smallii*, coarse extreme; 10 and 11, *E. Smallii*, slender extreme; 12–14, *E. perlonga*, from type specimen; 15 and 16, *E. calva;* 17–26, *E. uniglumis*, var. *halophila;* 27 and 28, *E. mamillata*, from type-collection, *Lindberg fil.* in Dörfler Herb. Norm., no. 4383; 29 and 30, *E. mamillata* (*E. macrostachya*) from Salem, Illinois, *Bebb;* 31, *E. uniglumis* from Bavaria; 32, 32a and 33, *E. kamtschatica* from Alaska; 34 and 35, *E. xyridiformis*, from type-specimen.

V. A NOTE ON POA LABRADORICA.

M. L. Fernald.

On page 44 I described as a new species, *Poa labradorica*, a characteristic grass of eastern Labrador, distinguished from *P. eminens* Presl by its narrower and greener leaves, stricter panicle, 2–3-flowered spikelets glabrous throughout (except for pilosity at the base of the lemma), and narrower and more acute glumes. I am chagrined to find that I overlooked *P. labradorica* Steudel, Syn. Pl. Gram. 252 (1854), which is undoubtedly the same as my own *P. labradorica*. Steudel's description emphasizes the same characters; and I am informed by Professor Hitchcock that: "Mrs. Chase examined the type [Steudel's] at Paris. It was collected by Albrecht. Her notes state that it is *Poa eminens* or a closely allied species."

In view of Steudel's description of the plant, with "foliis . . . 2″ longis, 1–2‴ latis . . . ; paniculae elongatae contractae strictae (4–6-pollicaris) radiis erectis subadpressis . . . glabris; spiculis . . . glabris . . . 2–3-floris; glumis inaequalibus altera spiculas fere superante acutata, altera breviore acutiuscula; valvula . . . glabra," there seems to be no question that *Poa labradorica* Fernald (1929) is P. LABRADORICA Steudel (1854).

ARISTIDA BASIRAMEA IN MAINE.—One day during last October while crossing a wornout pasture in the town of Bethel I picked up a small quantity of a grass which Prof. Fernald later determined as *Aristida basiramea* Engelm., noting that it is a "species of the Mississippi Basin, not previously known in New England."

The plants were growing in fair abundance in the drier, more gravelly portions of the pasture. While this corner of the pasture covered an area of some two acres no definite search for the limits of the range of the grass was made. This remains for another season to determine.

The fact that this station lies some three or more miles across country from the nearest railroad, would seem to preclude Prof. Fernald's suggestion that it be a railroad immigrant; but his other suggestion of an introduction in grass seed bears the stamp of possibility and, perhaps, under the circumstances, of probability. The present owner, S. L. Grover, who has lived on the premises for many

years, assures me that a portion of this ground was plowed and seeded some twenty-five years ago. That the grass is not now confined to the seeded area but has sought to quite an extent drier ground where the competition is less keen would not disprove the possibility of its introduction.—Leston A. Wheeler, Bethel, Maine.

A NEW OAK FROM FLORIDA.

W. W. Ashe.

In a trip through middle peninsular Florida there was frequently seen in the "scrub" in Highlands and Polk Counties an oak which was so different from any other species of the southeastern states as to deserve notice. A description of its characters is as follows:

Quercus **inopina**, sp. nov. A slender tree 6 m. high or usually a single-stemmed shrub; leaves entire, tough, coriaceous, dimorphous; the lower and larger spreading, obovate and often complanate, broadest at or above the middle, rounded or abruptly acute at the apiculate apex, narrowed at base, the blades 5 to 9.5 cm. long, 4 to 5.5 cm. wide, with 5 to 7 pairs of irregular forking lateral veins which seldom reach the margin; the upper leaves erect or ascending, elliptic or obovate, concave, the margins white, indurated, often involute, or in the shade complanate, reticulated above, the blades 3 to 5 cm. long, 1.5 to 2.5 cm. broad (when flattened), with 4 to 6 pairs of obscure lateral veins, tipped with a short mucro about 5 mm. long; above dark yellow green, pale yellow green below, when they unfold covered above with short gray stellate pubescence, eventually nearly glabrate except for the midrib, below covered with loose often deciduous snuff-colored scurfy pubescence, the midrib broad and flat not prominent; the scurfy flattened petiole 2 to 3 mm. long. Twigs slender, covered when young with reddish pubescence, at length glabrate, becoming gray the second year; buds reddish, large, ovate, acute, the scales acute, appressed-pubescent. Aments from 2.5 to 3.5 cm. long, loosely flowered, grayish-pubescent with long matted hair; stamens about 6. Fruit, maturing the second season, is solitary or rarely in pairs, on a short peduncle about 1 mm. long; the cup, 14 to 17 mm. wide, flattened or slightly pointed at base, the puberulous obtuse scales forming a thin margin, incloses only the lower one-fourth of the ovate pubescent-tipped nut from 12 to 15 mm. thick.

Sand hills in the south end of the "scrub" in Highlands and Polk Counties, Florida. Shore of Lake Annie, west of Childs (type); south of Sebring; between Avon Park and Arbuckle Creek; south of Frostproof (all May 25, 1928); shore of Lake Annie, collected for W. W. A. September, 1928.

Quercus inopina is intermediate in general characters between *Q. myrtifolia* Willd. and *Q. Arkansana* var. *caput-rivuli* Ashe. It differs from the former in the elliptic and not obovate form of the leaves on fruiting shoots, in the yellowish-green and not blue-green color of its foliage, in the cups often pointed at base and in its scurfy pubescence. From the latter it differs in its smaller and elliptic foliage; in its golden yellow scurf and in the smaller size of its fruit. It is probable that it is most closely related to the latter species and represents an extreme development from it. In the scrub it is associated with *Quercus chapmanii* Sarg., *Q. myrtifolia* Willd., *Q. catesbaei* Michx. and *Hicoria Floridana* Ashe.

Washington, D. C.

Habenaria dilatata on Cape Cod.—Some years ago Miss Eleanor Riddle brought to Professor Fernald a specimen of *Habenaria dilatata* collected at Sandwich, on Cape Cod. The plant had not subsequently been collected, but having heard about the plant from both Miss Riddle's mother and Professor Fernald and being in Sandwich, I went to Shawme Lake, where Miss Riddle had found the plant. At the southern end of the lake numerous springs enter, and in the wet ground about these *Habenaria dilatata* is abundant, approximately two hundred specimens being apparent. The plant is of a decidedly northern range. The only Massachusetts records east of the Connecticut Valley are Lancaster, *Nora F. Thayer* in 1904 (specimen in herb. New England Botanical Club), Stoneham (coll. *Wm. Boott* in Gray Herbarium), and Lexington (Baldwin's *Orchids of New England*). In the damp thickets adjacent to the lake the ground is covered with a sprawling grass, *Festuca nutans*, which is occasional in rich woods of northeastern Massachusetts, and has not been known southeast of the Boston Region (Oak Island, Revere; Needham; Wellesley; in herb. New England Botanical Club). Growing with *Habenaria dilatata* and forming extensive mats is *Chrysosplenium americanum*, and the yellow birch, *Betula lutea*, is represented by several large trees. Both of these are southern outliers, reported previously in one or two stations in the Sandwich-Barnstable area. *Isoetes Tuckermani* forms a solid turf in the shallow water, and *Potamogeton Robbinsii*, known previously on Cape Cod from a single plant collected at Mashpee, occurs in somewhat deeper water.—H. K. Svenson, Cambridge, Massachusetts.

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Boulder on Jordan Pond Trail with Memorial Tablet to Edward Lothrop Rand

Rhodora

JOURNAL OF

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FURTHER ADDITIONS TO THE MT. DESERT FLORA.

G. L. Stebbins, Jr.

(Plates 185 and 186)

The island of Mt. Desert, on the Maine coast, has probably been visited by more botanists than any other equal area in the state, but by far the most thorough botanizing of this famous resort was done by Edward L. Rand. After the publication of the Rand and Redfield flora of the island, a catalogue admittedly incomplete, Mr. Rand collected extensively on Mt. Desert and the adjacent islands until 1920, and at his death in 1924, these collections, about 7000 unmounted and unnamed sheets, were left to the New England Botanical Club.

In recognition of his work, his friends, in particular Professor Horatio N. Reynolds, of New Haven, erected a tablet to his memory near Seal Harbor, in the woods which he knew and loved so well, and on the trail, that from Seal Harbor to Jordan Pond, which he travelled most in his collecting trips. Members of the New England Botanical Club and other readers of Rhodora will be interested in the photographs of this memorial, here reproduced (Plates 185 and 186) through the generosity of one of Mr. Rand's life-long friends.

It has been the writer's pleasure for the past two years to study and identify Mr. Rand's later collection, which proved to contain many interesting additions to the varied flora of this remarkable island. Its flora is probably even yet not completely known, as is evidenced by the number of new discoveries that the writer himself has made during the past three summers.

A list of the plants in the Rand herbarium not previously reported from the island, together with a few of the writer's own collections (indicated by his initials) follows. The area in which Mr. Rand made his later collections was increased over that of the flora by the addition of Great Gott Island, a part of Long Island Plantation immediately adjoining Mt. Desert on the south, and species from this island have therefore been included among the additions to the Mt. Desert flora. A few casual garden escapes, which have plainly failed to become permanent additions to the island flora, have been omitted from this list. When collections were not made by Mr. Rand himself, the name of the collector is given.

Asplenium Trichomanes L. Crevices in cliffs, very rare and local. Newport Mt.; Cadillac Cliffs; Barr Hill (*H. N. Reynolds*).

Athyrium angustum (Willd.) Presl. var. laurentianum Butters. Pemetic Mt.

Botrychium angustisegmentum (Pease & Moore) Fernald. Woods, Seal Harbor (*H. N. Reynolds*).

Botrychium virginianum (L.) Sw. Damp woods, Hunter's Brook Valley (*G. L. S., Jr.*).

[Equisetum palustre L. Erroneously recorded from Jordan Stream in "Wild Flowers of Mt. Desert Island" by E. T. Wherry through a misidentification by the writer.]

Lycopodium annotinum L. var. acrifolium Fernald. Little Harbor Brook Valley.

Isoetes macrospora Dur. Somes Stream.

Picea mariana (Mill.) BSP. Frequent in sphagnum heaths.

Triglochin palustris L. Salt marsh, Baker Island.

Digitaria Ischaemum Schreb. Wildwood Farm, Seal Harbor.

Andropogon scoparius Michx. var. frequens Hubbard. Jordan Bluffs (*G. L. S. Jr.*); Shore Path, Seal Harbor (*G. L. S. Jr.*).

Panicum miliaceum L. Seal Harbor.

Panicum linearifolium Scribn. var. Werneri (Scribn.) Fernald. Shore Path, Seal Harbor.

Phalaris arundinacea L. Baker Island.

Oryzopsis pungens (Torr.) Hitchc. Dry woods south of Picket Mt. (*G. L. S. Jr.*).

Ammophila breviligulata Fernald. Sand Beach, near Great Head.

Holcus lanatus L. Roadside, Mountain Drive (*G. L. S. Jr.*).

Arrhenatherum elatius (L.) Beauv. Roadsides, Seal Harbor (*G. L. S. Jr.*).

Eragrostis megastachya (Koeler) Link. Bracy Cove.

Melica striata (Michx.) Hitchc. Woods, Jordan Stream (*G. L. S. Jr.*).

Memorial Tablet on Jordan Pond Trail, Mt. Desert Island

Poa saltuensis Fernald & Wiegand. Not uncommon in damp woods. Wildwood Farm Path, Seal Harbor.

Var. microlepis Fernald & Wiegand. Bog, between the Triad and Day Mt.

Puccinellia fasciculata (Torr.) Bickn. Salt marsh, Great Duck Island. The second station in Maine for this plant, and the only one east of York County.

Festuca ovina L. Extensively introduced as a lawn and pasture grass.

Festuca capillata Lam. Common in woods and fields.

Festuca arundinacea Schreb. Well established on Upland Road, Seal Harbor (*G. L. S. Jr.*). The first station recorded in New England for this European species.

Bromus secalinus L. Seal Harbor; Long Pond Meadows; Jordan Pond.

Bromus hordeaceus L. Wildwood Farm, Seal Harbor (*G. L. S. Jr.*).

Bromus racemosus L. Seal Harbor.

Bromus commutatus Schrad. Waste lot, Bar Harbor (*G. L. S. Jr.*).

Bromus tectorum L. Wildwood Farm, Seal Harbor.

Lolium perenne L. Roadside, north end of Bubble Pond (*G. L. S. Jr.*).

Agropyron caninum var. tenerum (Vasey) Pease & Moore. Frequent along the shore. Also Sargent Mt.; Green Mt.

Hordeum vulgare var. trifurcatum (Schlecht.) Koern. & Wern. Foot of Long Pond.

Rhynchospora capitellata (Michx.) Vahl. South shore of Bubble Pond.

Carex vulpinoidea Michx. Dump, Seal Harbor. Introduced from farther south.

Carex laevivaginata (Kueckenthal) Mackenzie. Clement Meadow, Seal Harbor.

Carex salina var. kattegatensis (Fries) Almq. Great Duck Island.

Carex limosa L. Great Cranberry Island; Little Cranberry Island; Ship Harbor Heath (*C. E. & E. Faxon*).

Xyris caroliniana Walt. Seal Cove Pond; Lower Breakneck Pond.

Lilium tigrinum Ker. Well established on roadside, Seal Harbor (*G. L. S. Jr.*); Great Cranberry Island (*G. L. S. Jr.*).

Sisyrinchium gramineum Curtis. East of Hunter's Brook; roadside near Northwest Arm, Great Pond.

Cypripedium parviflorum Salisb. Damp woods, near Jordan Stream (*Miss E. L. Shaw*). The station for var. pubescens in the same region (Rhodora **10:** 145) has been destroyed.

Habenaria macrophylla Goldie. Woods, south of Bubble Pond.

Salix purpurea L. Little Cranberry Island.
Populus alba L. Roadside, Otter Creek (*G. L. S. Jr.*).
Ostrya virginiana (Mill.) K. Koch. Beech Hill (*Sam Lurvey*).
Alnus rugosa (DuRoi) Spreng. Jordan Stream, near Jordan Pond (*G. L. S. Jr.*).
Chenopodium hybridum L. West shore, Great Cranberry Island.
Silene antirrhina L. Beech Hill.
Var. divaricata Robinson. Seal Harbor.
Ranunculus aquatilis L. var. capillaceus DC. Pray's Brook.
Actaea rubra (Ait.) Willd. Woods, east of Bald Peak.
Forma neglecta (Gilman) Robinson. Woods, near Sand Beach.
Berteroa incana (L.) DC. Southwest Harbor (*Annie S. Downs*).
Alyssum alyssoides L. Bar Harbor.
Lepidium apetalum Willd. Frequent in waste places.
Lepidium campestre (L.) R. Br. Bar Harbor.
Camelina sativa (L.) Crantz. Near Denning Brook, Somesville.
Camelina microcarpa Andrz. Seal Harbor.
Conringia orientalis (L.) Dumort. Near Denning Brook, Somesville; Great Cranberry Island.
Sisymbrium altissimum L. Seal Harbor; Southwest Harbor.
Erysimum cheiranthoides L. Seal Harbor; Bar Harbor.
Arabis Drummondi Gray. East side of Dog Mt. (*G. L. S. Jr.*).
Reseda alba L. Wildwood Farm, Seal Harbor.
Drosera rotundifolia var. comosa Fernald. Sandy shores, Jordan Pond (*G. L. S. Jr.*). The only known station in New England for this interesting variety.
Sorbaria sorbifolia (L.) R. Br. Escaped to roadside, near Oak Hill.
Amelanchier Bartramiana (Tausch.) Roem. Green Mt.; Great Cranberry Island.
Crataegus columbiana Howell var. Brunetiana (Sarg.) Eggleston. Southwest Harbor.
Crataegus rotundifolia Moench. Juniper Cove.
Crataegus Brainerdi Sarg. Sand Beach, near Great Head.
Crataegus macracantha Lodd. Somesville.
Rosa rugosa Thunb. Common in cultivation, and escaping to beaches. Great Cranberry Island; Baker Island; Great Gott Island.
Prunus depressa Pursh. Cliffs, Jordan Mt. (*G. L. S. Jr.*); Picket Mt. (*G. L. S. Jr.*).
Prunus nigra Ait. Somesville.
Genista tinctoria L. Bar Harbor (*Schenck*).
Medicago sativa L. Seal Harbor.
Vicia hirsuta (L.) S. F. Gray. Somesville.
Vicia villosa Roth. Seal Harbor (*G. L. S. Jr.*).
Apios tuberosa Moench. Bar Harbor; west shore of Great Pond.
Euphorbia maculata L. Schooner Head Road, Bar Harbor. Probably introduced from farther south.

EUPHORBIA PEPLUS L. Weed in garden, Seal Harbor (*G. L. S. Jr.*).

ILEX VERTICILLATA var. TENUIFOLIA (Torr.) Wats. Jordan Pond; Great Cranberry Island.

Var. CYCLOPHYLLA Robinson. Jordan Mt.

Var. PADIFOLIA (Willd.) T. & G. Seal Harbor.

VIOLA RENIFOLIA Gray var. BRAINERDII (Greene) Fernald. Woods, Jordan Stream.

The "*V. blanda* var. *renifolia*" of the Rand & Redfield Flora is *V. incognita* Brainerd. *V. nephrophylla* Greene was erroneously included in Wherry's "Wild Flowers of Mt. Desert" through a misidentification of this specimen by the writer.

OENOTHERA PARVIFLORA L. Seal Harbor; near Hunter's Beach; Bracy Cove.

OENOTHERA LACINIATA Hill. Jordan Pond Road, Seal Harbor. Introduced from farther south.

OENOTHERA PRATENSIS (Small) Robinson. Seal Harbor (*Mrs. Sarah W. Boggs*). Probably introduced from farther west.

MYRIOPHYLLUM TENELLUM Bigel. Bubble Pond; Eagle Lake; Seal Cove Pond.

OSMORHIZA LONGISTYLIS (Torr.) DC. Somesville.

VACCINIUM CANADENSE forma CHIOCOCCUM Deane. Seal Harbor.

× LYSIMACHIA PRODUCTA (Gray) Fernald. Frequent in wet ground, with its parents.

LYSIMACHIA NUMMULARIA L. Escaped from garden, Somesville.

PENTAGLOTTIS SEMPERVIRENS (L.) Tausch. Seal Harbor. The only reported occurrence of this European species in North America, but probably only a casual introduction, as careful search has failed to reveal it in recent years.

VERBENA HASTATA L. Duck Brook Meadows.

VERBASCUM PHLOMOIDES L. Head of Northeast Harbor.

LINARIA REPENS Mill. Great Cranberry Island. Probably an escape, not seen in recent years.

PLANTAGO MAJOR L. var. INTERMEDIA (Gilibert) Dene. Salt marshes, Great Cranberry Island; Little Cranberry Island; Baker Island.

Var. ASIATICA (L.) Dene. Woods, Seal Harbor.

No specimen of *P. Rugelii* Dene. was found in the Rand Herbarium, and it is likely that his report of this species (RHODORA **10**: 145) was based on the specimen here cited.

ASTER NOVAE-ANGLIAE L. Escaped from cultivation, Bar Harbor.

ANTENNARIA PARLINII Fernald. Somesville.

ANTENNARIA CANADENSIS Greene. Seal Harbor (*Mrs. Sarah W. Boggs*).

Var. RANDII Fernald. Common.

Antennaria plantaginifolia (L.) Richards. Southwest Harbor.
Antennaria fallax Greene. Somesville.
Antennaria occidentalis Greene. Roadside near High Head.
Antennaria neodioica Greene. Seal Harbor; Somesville.
Var. grandis Fernald. Somesville.
Var. attenuata Fernald. Common.
Var. chlorophylla Fernald. Somesville; Town Hill; near Jordan Pond; near Northwest Arm, Great Pond.
Antennaria neglecta Greene. Frequent in fields.
Antennaria petaloidea Fernald. Bar Harbor; Southwest Harbor.
Var. subcorymbosa Fernald. Seal Harbor.
Heliopsis scabra Dunal. Bar Harbor (*Kate Furbish*); Seal Harbor. Introduced from farther west.
Helianthus laetiflorus Pers. Roadsides, Otter Creek (*G. L. S. Jr.*). Escaped from cultivation.
Matricaria suaveolens (Pursh) Buchenau. A common weed.
Chrysanthemum segetum L. Seal Harbor.
Tussilago Farfara L. Great Gott Island.
Cirsium muticum Michx. Baker Island.
Centaurea nigra L. Seal Harbor.
Var. radiata DC. Seal Harbor.
Centaurea maculosa Lam. Beech Hill.
Lapsana communis L. Seal Harbor; roadside, The Gorge.
Sonchus arvensis L. Seal Harbor.
Hieracium Pilosella L. Recently introduced, but now widespread.
Hieracium floribundum Wimm. & Grab. Common.
Hieracium pratense Tausch. Too common.
Hieracium murorum L. Seal Harbor (*Miss E. L. Shaw*).
Hieracium vulgatum Fries. Road to Sieur de Monts Spring, Bar Harbor (*G. L. S. Jr.*).

The writer acknowledges with thanks the aid of Professor M. L. Fernald, under whose direction the specimens of the Rand Collection were identified, and of Miss Elsie L. Shaw and Professor Horatio N. Reynolds, who showed the writer some of the stations for the plants listed, from which verification of the records was obtained.

The following are articles in Rhodora and other publications in which additions to the Mt. Desert flora have been published.

Chamberlain, E. B. Meeting of the Josselyn Botanical Society. Rhodora **10**: 172.
Fassett, N. C. A Plant New to Mt. Desert. *Ibid.* **29**: 253.
Rand, E. L. Pinus Banksiana in Eastern Maine. *Ibid.* **1**: 135.
Plants from the Duck Islands, Maine. *Ibid.* **2**: 207.
Galinsoga in Maine. *Ibid.* **5**: 258.
Arceuthobium pusillum at Mt. Desert. *Ibid.* **9**: 75.
Additions to the Plants of Mt. Desert Island. *Ibid.* **10**: 145.
Subularia aquatica on Mt. Desert Island. *Ibid.* **11**: 155.

Shaw, E. L. A New Station for Iris Hookeri in Maine. *Ibid.* **10**: 145.
Taylor, W. R. Additions to the Flora of Mt. Desert, Maine. *Ibid.* **23**: 65.
Wherry, E. T. Wild Flowers of Mt. Desert Island, Maine. Published by the Garden Club of Mt. Desert, 1928.

Harvard University.

A NEW ESTUARINE BIDENS FROM CHESAPEAKE BAY.

S. F. Blake.

Three species of *Bidens* are now known confined to estuaries along the eastern coast of North America from the Delaware River northward. *Bidens hyperborea* Greene, which has been studied monographically by Dr. N. C. Fassett,[1] is well known from Massachusetts northward, and has recently been reported from the Hackensack marshes of New Jersey.[2] In its achenial characters it stands apart from the two other species. The more northern of these, *Bidens eatoni* Fernald, ranges in its various forms[3] from the Hudson River north to Maine. The more southern species, *Bidens bidentoides* (Nutt.) Britton, was long supposed to be confined to Delaware River and Bay, but is listed also by Fassett,[4] on the basis of previous records by Stone and Svenson, from the Susquehanna River, the Maurice River of southern New Jersey (which empties into Delaware Bay), and the Hudson River.

In 1926 I collected plentiful specimens of a species of this group at Havre de Grace on the Susquehanna River and at Charlestown, Maryland, the latter a town on Northeast River, the northeasternmost prolongation of Chesapeake Bay. Study of this material, in connection with that in the United States National Herbarium and the Gray Herbarium, has shown that the plant of Chesapeake Bay, while very closely allied to *Bidens bidentoides* of the Delaware system, is constantly different in its shorter awns and pubescent corollas. In *B. bidentoides* the corollas are always glabrous and the achenes are 6.5–12 mm. long and not over 1 mm. wide, with awns 6–9 mm. long and nearly or quite twice as long as the dried disk corollas. In the Chesapeake Bay plant the corollas of both ray and disk are sparsely pilose on the tube, and the achenes are 6–10 mm. long,

[1] Rhodora **27**: 166–171. 1925.
[2] Fassett, Proc. Boston Soc. Nat. Hist. **39**: 104. 1928.
[3] Fassett, Rhodora **27**: 142–146. 1925.
[4] Proc. Boston Soc. Nat. Hist. **39**: 102. 1928.

slightly broader in proportion (1–1.5 mm. wide), and with awns 3–6 mm. long and about equalling or only slightly surpassing the disk corollas. In the Chesapeake plant, moreover, the leaves are in general more sharply toothed, the larger being sometimes laciniate-lobed toward base, and the herbaceous outer phyllaries are generally shorter than in *B. bidentoides*.

In view of these differences, particularly the positive character of pubescence on the corollas, which is not shown by either *B. bidentoides* or the related *B. eatoni* in the abundant material examined, I venture to describe the plant of Chesapeake Bay as a new species. Its relationship to *B. bidentoides* is so close that it is evident they have sprung from a common ancestor at no very remote date. Geologists tell us that in late Pleistocene times the peninsula of Maryland and Delaware was entirely submerged by a great depression known as the Wicomico Sea. This was followed by an uplift and then by the Talbot depression, which did not connect the two river systems, a further elevation and slight depression bringing us to the present time. The plant remains recovered from the Wicomico and older formations in this region include species of *Hicoria*, *Populus*, *Carpinus*, *Quercus*, *Ulmus*, *Celtis*, and *Platanus* very closely allied to living species. It is reasonable to suppose that the common ancestor of these species of *Bidens* grew in appropriate situations about the shores of Wicomico Sea, and that divergence of the two forms has taken place since that epoch.

Bidens **mariana** Blake, sp. nov. Essentially glabrous annual, about 50–80 cm. high, with usually erect branches; leaves lanceolate, simple, attenuate, sharply serrate or serrulate, occasionally deeply laciniate-lobed toward base, the larger 13–24 cm. long, including the narrowly margined petiole; heads subcylindric or in age subcampanulate, in 2's and 3's at apex of stem and branches, forming a leafy panicle, the larger 18–32-flowered; outer phyllaries 4–5, oblanceolate or linear-oblanceolate, often twice as long as the heads; rays when present few, not exceeding disk; disk corollas sparsely pilose on tube; achenes narrowly linear-cuneate, densely antrorse-hirsute, 2(–4)-awned, the inner 8–10 mm. long, their awns slender, 5–6 mm. long.

Stems normally erect, stoutish, usually sparsely pilosulous at base of internodes, leafy; leaves mostly 1.5–3 cm. wide (occasionally 7.5 cm. across the basal lobes), thin, glabrous, the larger sometimes with 1 or 2 lance-linear spreading lobes on each side toward base; disk in flower about 1.5 cm. high, about 7 mm. thick; outer phyllaries loosely erectish, 1.3–3 cm. long, 1.5–4 mm. wide, sometimes minutely

denticulate above, not ciliate; inner phyllaries 9–13 mm. long, pale yellow, densely lined with shining brown except toward margin;

FIG. 1. *Bidens mariana* Blake, from a specimen of the type collection. Leaf and tip of stem, × 1; disk-achene and corolla, × 4

rays 0–3, not exserted, golden yellow, the tube sparsely pilose, about 1.5 mm. long, the lamina elliptic, tridenticulate, about 6 mm. long; disk corollas 17–31, golden yellow, 4–5-toothed, sparsely pilose on tube with several-celled hairs, 4–5.8 mm. long (tube 1.5–2.3 mm.,

throat subcylindric, 2–2.5 mm., teeth usually somewhat unequal, 0.5–1 mm. long); pales linear, yellow above, with 3 brown vittae, about 1.5 cm. long; ray achenes inane, linear, pubescent like disk achenes, 6 mm. long, 1 mm. wide, their awns 2, upwardly hispid, unequal, 1.2–2 mm. long; outer disk achenes narrowly linear-cuneate, flat, 1-ribbed on middle of each side, dull brownish, densely hirsutulous with subappressed entirely antrorse hairs, 6–6.5 mm. long, 1.2–1.5 mm. wide, 2- or sometimes 4-awned, the longer awns usually subequal, 3–4.5 mm. long, the shorter awns when present 1.5 mm. long or less, all slender and antrorse-hispid; inner achenes similar but longer and narrower, 8–10 mm. long, 1–1.5 mm. wide, the longer awns 5–6 mm. long, the shorter when present up to 3.5 mm. long.

MARYLAND: sandy shore of Northeast River, near Carpenter's Point, Charlestown, 17 Sept. 1926, *Blake* 9698 (TYPE no. 1,365,722, U. S. Nat. Herb.; duplicates in Gray Herb., N. Y. Bot. Gard., Field Mus., etc.); in vegetable refuse at mouth of drain of bog half mile south-southwest of Havre de Grace, 20 Sept. 1902, *G. H. Shull* 399 (U. S.); sandy shore of Susquehanna River, Havre de Grace, 17 Sept. 1926, *Blake* 9703 (U. S., Gray Herb., etc.); sandy shore, Bush River, *Canby* (Gray Herb.).

BUREAU OF PLANT INDUSTRY,
Washington, D. C.

CONSIDERATION OF NOMENCLATURE AT THE FIFTH INTERNATIONAL BOTANICAL CONGRESS

[The following communications from the Executive Committee for the Fifth International Botanical Congress to be held at Cambridge, England, August 16th to August 23rd, 1930, are self-explanatory.—EDS.]

Dear Sir,

The Executive Committee of the Fifth International Botanical Congress will be very grateful if you will kindly publish in your periodical as soon as possible the enclosed notice on the subject of Nomenclature in *one* of the three languages in which the notice is printed.

As the matter is very urgent the Executive Committee trust that you will be able to comply with this request without delay.

Yours faithfully,

F. T. BROOKS
(Secretary)

Motions on the subject of Nomenclature for consideration by the Congress should be in the hand of the Rapporteur général, Dr. John Briquet, before *September 30, 1929.*

Motions must be presented in the form of additional articles (or amendments) to the Rules of 1905–1910, drawn up in the form adopted in the *International Code*, and must be drafted as briefly as possible in Latin, English, French, German, or Italian. At least 100 printed copies must be presented.

According to the decisions of the Brussels Congress 1910, only motions relating to new points which were not settled in 1905 and 1910 can be presented. Motions which do not answer to these conditions shall only be discussed if the Cambridge Congress 1930 decides to take them into consideration.

For further information about the programme of work for nomenclature, apply to the Rapporteur général, Dr. John Briquet, Conservatoire botanique, Geneva (Switzerland).

PROPOSED AMENDMENTS TO THE INTERNATIONAL RULES OF BOTANICAL NOMENCLATURE

presented by

M. L. Fernald and C. A. Weatherby

I. To add to the list of *Nomina Generica Conservanda* the following:

No.	Fam.	Nomina conservanda	Nomina rejicienda
5	Polypodiac. (Christens.)	*Cystopteris* Bernh. Schrad. Journ. i. pt. 2: 5 and 26 (1806). Standard-species: *C. fragilis* (L.) Bernh.	*Filix* Adans. Fam. Pl. ii. 20 and 558 (1763); Ludw. Inst. Hist. Phys. Regni Veg. ed. 2: 142 (1757) in part only.
1181	Amaryllidac.	*Zephyranthes* Herb. App. Bot. Reg. 36 (1821) Standard-species: *Z. Atamasco* (L.) Herb.	*Atamosco* Adans. Fam. Pl. ii. 57, 524 (1763).
1559	Orchidac.	*Calypso* Salisb. Parad. Lond. t. 89 (1807); not Thouars, Hist. Veg. Isles Austr. Afr. i. 33, t. 6 (1805). Standard-species: *C. bulbosa* (L.) Oakes.	*Cytherea* Salisb. Trans. Hort. Soc. i. 301 (1812).
1923	Morac.	*Broussonetia* L'Hér. ex Vent. Tabl. iii. 547 (1799); not Ortega, Nov. Pl. Descr. Decad. 61, t. 7 (1798). Stand-	*Papyrius* Lam. Illustr. t. 762 (1798).

No.	Fam.	Nomina conservanda	Nomina rejicienda
		ard-species: *B. papyrifera* (L.) Vent.	
2884	Cruciferae	*Coronopus* Gaertn. Fruct. ii. 293 (1791); not Mill. Gard. Dict. Abr. ed. 4 (1754). Standard-species: *C. Ruellii* Gaertn.	*Carara* Medic. Pflanzengatt. i. 34 (1792)
3557	Leguminosae	*Hoffmanseggia* Cav. Ic. iv. 63, t. 392, 391, fig. 1 (1797). Standard-species: *H. falcaria* Cav.	*Larrea* Ort. Dec. 15, t. 2 (1797).
3709	Leguminosae	*Dalea* Juss. Gen. 355 (1789); not Mill. Gard. Dict. Abr. ed. 4 (1754), nor P. Br. Hist. Jam. 239, 314 (1756), nor Gaertn. Fruct. i. 235, t. 51 (1788). Standard-species: *D. alopecuroides* Willd. (*Psoralea Dalea* L.).	*Parosela* Cav. Descr. Pl. 185 (1802).
6200	Ericac.	*Lyonia* Nutt. Gen. i. 266 (1818); not Raf. Med. Repos. v. 353 (1808); nor Ell. Sk. Bot. S. Car. and Ga. i. 316 (1817). Standard-species: *L. ferruginea* Nutt.	*Xolisma* Raf. Am. Mo. Mag. iv. 193 (1819).

II. To add to the list of *Nomina Generica Conservanda* the following, in case the amendment to Art. 50 proposed by Dr. A. S. Hitchcock ("Eliminate the words: or because of the existence of an earlier homonym which is universally regarded as non-valid") is adopted:

No.	Fam	Nomina conservanda	Nomina rejicienda
381	Gramineae	*Scolochloa* Link, Hort. Berol. i. 136 (1827), not Mert. & Koch, Deutschl. Fl. i. 374, 528 (1823). Standard-species: *S. festucacea* (Willd.) Link.	*Fluminea* Fries, Sum. Veg. Scand. i. 247 (1846).

No.	Fam.	Nomina conservanda	Nomina rejicienda
3209	Saxifragac.	*Jamesia* T. & G. Fl. N. Am. i. 593 (1840); not Raf. Atl. Journ. (1832), 145. Standard-species: *J. americana* T. & G.	*Edwinia* Heller, Bull. Torr. Bot. Cl. xxiv. 477 (1897).
3448	Leguminosae	*Schrankia* Willd. Sp. Pl. iv. pt. 2: 1041 (1806); not Medic. Pfl. Gatt. 42 (1792). Standard-sp.: *S. quadrivalvis* (L.) Merr. (*S. aculeata* Willd.).	*Morongia* Britton, Mem. Torr. Bot. Cl. v. 191 (1894).
3973	Zygophyllac.	*Larrea* Cav. An. Hist. Nat. ii. 119, t. 18, 19 (1800); not Ort. Dec. 15, t. 2 (1797). Standard-species: *Larrea nitida* Cav.	*Covillea* Vail, Bull. Torr. Bot. Cl. xxii. 229 (1895).

III. To add to the list of *Nomina Generica Conservanda* the following, in case DALEA Juss. (no. 3709) is not conserved:

No.	Fam.	Nomen conservandum	Nomen rejiciendum
7569	Scrophulariac.	*Microdon* Choisy, Mém. Soc. Phys. Gen. ii. pt. 2, 97 (1823). Standard-species: *M. ovatus* (L.) Choisy.	*Dalea* Gaertn, Fruct. i. 235, t. 51 (1788).

DISCUSSION OF THE AMENDMENTS

AMENDMENT I.

5 *Cystopteris* Bernh. Schrad. Journ. i. pt. 2: 5 and 26 (1806).

If *Filix* were universally conceded to be the "name of a class, order, family or genus" (Art. 51) it would be automatically excluded; but it can hardly be considered as technically belonging to this group of names any more than would such names as Lichen, Muscus, Gramen and other equivalents for loosely circumscribed groups. *Filix* Ludw. as diagnosed in his Def. Pl. 140 (1737) covers all forms of bipinnate species of *Polystichum, Athyrium, Thelypteris* (*Dryopteris*) and *Cystopteris;* it can hardly be typified because of entire lack of citations and it might be treated as a *nomen confusum*. *Filix* Adans. seems to rest chiefly on *Cystopteris*. Although he cited numerous synonyms of Dioscorides and others, the only clearly identifiable synonym was *Filix baccifera* Cornut (*Cystopteris bulbifera*), which was accompanied by a recognizable plate. Mackenzie, Am. Fern. Journ. xv. 40–45 (1925) makes out that *Filix* Ludw. equals *Pteris* L. Under this interpretation *Filix* Adans. would be freed for use under the International Rules as they stand. *Cystopteris* has

been almost universally used; *Filix* has been generally substituted by followers of the American Code since Underwood took it up in 1900. In order that there be no further misunderstanding, we move the conservation of *Cystopteris*.

1181 *Zephyranthes* Herb. App. Bot. Reg. 36 (1821).

Zephyranthes Herb. (1821) has been almost universally used for the ornamental genus of *Amaryllidaceae* much in cultivation. It is antedated by *Atamosco* Adans. (1763), a name first taken up after Adanson's publication by Greene, Pittonia, iii. 187 (May, 1897), although, in 1825, Rafinesque had independently published *Atamasco* Raf. Neog. 3 (1825), based on the same type as *Atamosco*. *Atamosco* has been taken up in America since 1897. If it is desired to retain the better known name, *Zephyranthes*, it will be necessary to conserve it. We move that *Zephyranthes* be conserved.

1559 *Calypso* Salisb. Par. Lond. pl. 89 (1807).

Calypso Salisb. has been very generally used for more than a century for a familiar orchid of boreal regions. In 1905, House, Bull. Torr. Bot. Cl. xxxii. 382 (1905) set it aside because of the earlier *Calypso* Thouars (1805) and took up *Cytherea* Salisb. (1812), a name subsequently adopted by Britton and some others in American. *Calypso* Thouars was reduced to *Salacia* L. (1771) by De Candolle in 1824, but it was maintained as a genus by G. Don, Gen. Syst. i. 629 (1831) and by Martius, Flora, xx. pt. 2, Beibl. 96 (1837). Subsequent authors seem consistently to have reduced *Calypso* Thouars to *Salacia*. At present *Calypso* Salisb. is invalid under any code and, if it is desired to retain it, it should be made a nomen conservandum. We move the conservation of *Calypso*.

1923 *Broussonetia* L'Hér. ex Vent. Tabl. iii. 547 (1799).

Broussonetia L'Hér. has been almost universally used for the moraceous genus well known economically and as cultivated trees, but it is antedated by one year by *Papyrius* Lam. (1798). *Papyrius* was used by Cav. Descr. (1802) but was apparently not taken up by subsequent authors until revived by Kuntze, Rev. Gen. 629 (1891). *Broussonetia* Ortega (1798) has apparently not been recognized by subsequent authors and by both Pfeiffer and Dalla Torre & Harms is cited as belonging to *Sophora* L. (1753). If *Broussonetia* L'Hér. is to be maintained it must be specially conserved. We move its conservation.

2884 *Coronopus* Gaertn. Fruct. ii. 239 (1791).

Coronopus Mill. (1754) was based on species of *Plantago* L. (1753), which are ordinarily retained under *Plantago*. While Miller's genus has only rarely been taken up, it has clear priority over *Coronopus* Gaertn. (1791). If the latter is to be maintained it will be necessary specially to conserve it. We move the conservation of *Coronopus* Gaertn.

3557 *Hoffmanseggia* Cav. Ic. iv. 63, pl. 392, 391, fig. 1 (1797).

Although *Hoffmanseggia* and *Larrea* Ort. (1797) were published in the

same year, Cavanilles admitted, in publishing *Hoffmanseggia*, that he was renaming *Larrea* Ort. *Hoffmanseggia* is, therefore, later and technically invalid. It has, however, been universally used for a well known and rather large leguminous genus and *Larrea* Ort. has not been taken up, although Briquet, Schröt. Festschr. 656 (1925) points out that it is the valid name for *Hoffmanseggia*. The name *Larrea* Cav. (1800) has for more than 125 years been generally applied to a genus of the *Zygophyllaceae* (see No. 3973). To overthrow *Hoffmanseggia* for *Larrea* Ort. would create needless confusion. *Hoffmanseggia* should, therefore, be conserved.

3709 *Dalea* Juss. Gen. 355 (1789).

Dalea Mill. (1754) is a direct renaming of *Browallia* L. (1753) and may be neglected as an absolute synonym under the International Rules as they stand. *Dalea* P. Br. (1756) was used for plants of two entirely different groups. On p. 239 he had a *Dalea* 1, perhaps myrtaceous, a tree of Jamaica, but without generic diagnosis or specific name; but on p. 314 he had another *Dalea* 1, again without generic diagnosis and in the caption of the plate called *Eupatorium Dalea*. Neither of the uses of *Dalea* by Browne is valid and his names have no nomenclatorial status. *Dalea* Gaertn. (1788) was absorbed by Choisy into his *Microdon*, Mém. Soc. Phys. Gen. ii. pt. 2: 97 (1823). *Microdon* has been taken up by Endlicher, Bentham & Hooker and Wettstein, although it is greatly antedated by *Dalea* Gaertn., which was perfectly valid for the genus. *Dalea* Juss. (1789), however, has been generally used for a genus of *Leguminosae*, a genus of 150 ± species, but in 1894 it was abandoned by Britton in favor of *Parosela* Cav. (1802). Because of the confusion which would arise if the name *Dalea* were now transferred to *Microdon*, the late S. B. Parish (Bot. Gaz. lv. 301 (1913)) has recommended that *Dalea* Juss. be conserved.

6200 *Lyonia* Nutt. Gen. i. 266 (1818).

Xolisma Raf. (1819) was a direct renaming of Lyonia Nutt., because of the earlier *Lyonia* Raf. (1808). *Lyonia* Raf. (1808) was a direct renaming of *Polygonella* Michx. (1803), a change made simply because Rafinesque considered Michaux's name inappropriate. It is, therefore, absolutely invalid. *Lyonia* Ell. (1817) is, according to Rehder, Journ. Arn. Arb. v. 49 (1924), the earliest and, therefore, the valid name for the asclepiadaceous genus *Seutera* Reichenb. Consp. 131 (1828), a genus not maintained by most monographers of the *Asclepiadaceae*. *Lyonia* Ell. (1817) has not been used by those who do recognize the genus *Seutera*. *Lyonia* Nutt. (1818), on the other hand, has been used by Sprengel, Endlicher, DeCandolle, Bentham & Hooker, Drude in Engler & Prantl and others. *Xolisma* Raf. (1819) was revived by Britton, Mem. Torr. Bot. Cl. iv. 135 (1894) and is used by followers of the American Code and recently by Rehder. The use of the technically correct name *Lyonia* Ell. for *Seutera* would create confusion not only in the *Asclepiadaceae*, but in the *Ericaceae*. We move the conservation of *Lyonia* Nutt.

Amendment II.

381 *Scolochloa* Link, Hort. Berol. i. 136 (1827).

Scolochloa Mert. & Koch (1823) was based on *Arundo Donax* L.; but, if Professor Hitchcock's amendment as to homonyms is adopted, *Scolochloa* Link, the name of a well known northern grass, will have to give way to *Fluminea* Fries, unless *Scolochloa* is specially conserved.

3209 *Jamesia* T. & G. Fl. N. Am. i. 593 (1840).

Jamesia Raf. (1832) was based on *Psoralea Jamesii* Torr., which is generally kept in the genus *Dalea* Juss. (1789) or *Parosela* Cav. (1802)—see No. 3709. Rafinesque's *Jamesia* has been taken up by no subsequent author; but *Jamesia* T. & G. (1840) is a generally used name for a genus of shrubs of North America with one species widely known in cultivation as *Jamesia*. If *Jamesia* T. & G. is to be maintained it will be necessary specially to conserve it, at least if Dr. Hitchcock's amendment as to homonyms is adopted. In that case we should move the conservation of *Jamesia* T. & G.

3448 *Schrankia* Willd. Sp. Pl. iv. pt. 2: 1041 (1806).

Schrankia Willd. (1806) is a familiar tropical genus, which had almost universally been known by that name when, in 1894, Britton substituted for it the name *Morongia*, because of *Schrankia* Medic. (1792). *Schrankia* Medic. (1792) was based on *Myagrum rugosum* L., a species referable to *Rapistrum* Medic. (1794). No one but Moench (1794) seems to have taken up *Schrankia* Medic. If, however, *Schrankia* Willd. is to be maintained for the genus of the *Mimosoideae* it will be necessary specially to conserve it, at least if Dr. Hitchcock's amendment as to homonyms is adopted. In that case we should move the conservation of *Schrankia* Willd.

3973 *Larrea* Cav. An. Hist. Nat. ii. 119, pl. 18, 19 (1800).

Even though *Larrea* Ort. (1797) may be eliminated by the conservation of *Hoffmanseggia* (see No. 3557), *Larrea* Cav. (1800) would be abandoned or would have to be conserved, if Dr. Hitchcock's amendment as to homonyms is adopted. (See Briquet. Schröt. Festschr. 659 (1925)). In that case we should move the conservation of *Larrea* Cav.

Amendment III.

7569 *Microdon* Choisy, Mém. Soc. Phys. Gen. ii. pt. 2: 97 (1823).

If *Dalea* Juss. (see No. 3709) is not conserved, *Dalea* Gaertn. (1788) must replace *Microdon* Choisy (1823) unless the latter is conserved.

Gray Herbarium
Harvard University.

CHAMAECYPARIS THYOIDES IN NEW HAMPSHIRE.

H. K. Svenson.

During the last week in September, 1928, the writer, while returning from the White Mountains, with a few hours at his disposal,

went to Black Pond in the almost deserted township of Windsor, New Hampshire, where "cedar" was said by the inhabitants to grow in large quantities. Since *Thuya occidentalis* in this part of New Hampshire is known only from the calcareous region bordering the Connecticut River, it was hardly to be expected in the swamps bordering the black waters of a typical mountain pond in an acid area. The "cedar" turned out to be *Chamaecyparis thyoides*. The trees in the main swamp, which was said to cover more than a square mile, had in large part been killed by flooding, but many of the trees had been cut for telegraph poles and shingles.

The township of Windsor is bordered on the northwest by Washington and at East Washington, *Rynchospora Torreyana*, a rare sedge of Cape Cod, Rhode Island and the New Jersey pine barrens, was at one time collected. Accordingly, Professor Fernald and I set out from Cambridge a few days later, hoping to find the station for *Rynchospora Torreyana* associated with *Chamaecyparis* and all the other coastal-plain plants which would of course accompany these. After the usual vicissitudes of travel by Ford, we spent the night in a small hotel at Washington, and the next day in trying to locate a *Chamaecyparis* swamp in Washington or a pond with an extensive sand beach which might harbor our *Rynchospora*. Relying upon hearsay and a map we visited one pond after another. These all seemed to be at an approximate elevation of 1500 feet, always at the tops of extremely steep hills, which abounded in this region; the vegetation of *Picea rubra*, *Betula lutea*, and *Betula papyrifera* suggesting anything but coastal-plain affinity. However, we collected *Hippuris vulgaris* at Long Pond, the southernmost station known in New England. Late in the afternoon we gave up the *Chamaecyparis*, except for the avowed intention of stripping bark from one of the cedar telegraph poles along the road, for an herbarium specimen. These poles were becoming the sole proof to Professor Fernald that I had ever seen the tree, and even then they might have been imported, when just as we crossed from East Washington into the township of Bradford we found ourselves in the midst of a *Chamaecyparis* swamp. Our search here for *Rynchospora Torreyana* was cut short, for we figured that we had just time to reach Bradford Pond before dark—on the shores of which had been collected another famous coastal-plain plant, *Sclerolepis verticillata*, known otherwise in New England only from Wallum Pond on the boundary

of Massachusetts and Rhode Island, and extending southward from the New Jersey pine barrens. At Bradford Pond we found *Sclerolepis* growing in water with the boreal *Subularia aquatica*. Here the *Sclerolepis* was submersed and sterile, but farther along the sandy beach we found a few specimens in flower. This beach is the most extensive that I have seen on any pond, but was disappointing in the scarcity of coastal-plain plants. The shore is lined with a magnificent growth of *Pinus resinosa* and not *P. rigida* as was noted by *Lewis*, Rhodora vii. 186 (1905). By this time darkness had set in and our groping for specimens in the dim twilight ceased.

About the middle of November I had the opportunity of going to this region again, and noted a few *Chamaecyparis* trees at Bagley's Pond in Windsor, about two miles southeast of Black Pond, and about four miles south of the Bradford locality. The altitude of Bagley Pond is about 1200 feet, of Black Pond about 1000 feet, and of the Bradford station for *Chamaecyparis* about 800 feet. According to Sargent, N. Am. Silva x. 112 (1896), *Chamaecyparis thyoides* ranges from southern Maine to northern Florida. In a footnote he mentions that the highest elevation at which it has been reported is at High Point, New Jersey, where it grows in a cold deep swamp at an elevation of 1500 feet. Apparently it behaves similarly in New Hampshire. Sargent, Man. Trees ed. 2. 76 (1922), mentions its occurrence "near Concord, New Hampshire." Except for a specimen collected by C. F. Batchelder at Hancock, New Hampshire, which is less than ten miles south of Windsor, and which can be considered a part of the Bradford-Windsor area, and two specimens from the vicinity of Manchester (Chester, *C. C. Forsaith*, and Manchester, *W. H. Huse*, "25 miles north of Massachusetts and 50 miles west of the sea-coast"), it is represented in the Gray Herbarium and the Herbarium of the New England Botanical Club from the following northern limits: Lyman and Alfred in York County, Maine; to Rye, New Hampshire; thence to Andover, Bedford, Concord, Westboro, Hopkinton, Monson, and Springfield in Massachusetts; to Willington, Southington, and Wolcott in Connecticut. It very probably reaches the Windsor region through the lowland extending northward from Massachusetts and to the east of Mt. Monadnock.

Cambridge, Massachusetts.

Two New Plant Records for the Chicago Region.—In September, 1928, while collecting on the moorlands about Waukegan, Illinois, I discovered an unusual form of the choke cherry. Growing in sandy soil, in a mixed thicket of shrubbery and vines, there was a colony of at least three or four bushes, averaging three feet in height. They were loaded with fruit which immediately attracted attention because, although evidently ripe, it was amber-colored instead of the usual dark color of this species. Upon consulting Gray's Manual, I found that the plant was *Prunus virginiana* L., var. *leucocarpa* Wats.,[1] collected first at Dedham, Massachusetts, and recorded also from Maine, Connecticut, and New York, but unknown previously from the Central States.

In July, at Mineral Springs, Porter County, Indiana, near the shore of Lake Michigan, I found a bush of the common black raspberry the ripe fruit of which was pale yellow or amber. The shrub grew on the side of a thinly wooded sand dune. This well-marked color form is *Rubus occidentalis* L., f. *pallidus* (Bailey) Robinson, and constitutes another new record for the sand dunes and for the Chicago region. The form seems to have been found rather widely in the eastern United States, being reported from New England, New York, Delaware, and Kentucky, and by Deam from Lagrange and Owen counties, Indiana.

Specimens of both of these plants are deposited in the herbarium of Field Museum of Natural History.—Nellie V. Haynie, Chicago.

Anthesis in Spartina cynosuroides.—Professor Fernald, while collecting on Cape Cod on August 26, 1928, with J. M. Fogg, Jr., Paul Bowman, and the writer, called attention to the peculiar character of a colony of *Spartina cynosuroides* growing in the salt marsh at East Sandwich. In this colony some of the inflorescences were perfect while others appeared wholly pistillate or staminate, or variously unisexual. Such a situation is unusual in the grasses, and material was collected for examination. Upon dissection it was found that all spikelets had both stamens and pistils, but that the pistils matured much earlier. In such cases the plants with stigmas exserted would have the appearance of being wholly pistillate, the

[1] Since this plant differs from the typical form only in the color of fruit, it is better that it be considered a form rather than a variety:

P. virginiana L., f. **leucocarpa** (Wats.), comb. nov *P. virginiana* var. *leucocarpa* Wats. Bot. Gaz. xiii. 233 (1888).

stamens delayed in anthesis being still included within the lemma. It is possible that the stamens in such cases might remain permanently enclosed. Most grasses are characterized by the early extrusion of the anthers, but the condition in which the stigmas are the first to be developed, known as *proterogyny*, is stated by Hackel[1] to occur strongly in *Anthoxanthum*, *Pennisetum*, and *Spartina*. *Spartina cynosuroides* is rare in New England, the previously known stations (excluding Connecticut) being at Brewster and Dennis in Barnstable County, Wareham in Plymouth County, and Salisbury in Essex County, Massachusetts. —H. K. Svenson, Cambridge, Mass.

A new variety of Bidens eatoni.—

Bidens eatoni Fernald var. **illicita**, var. nov. Larger heads campanulate, 30–32-flowered; outer achenes 6–7 mm. long, 2 mm. wide, 2-awned, inner achenes 6.8–7.5 mm. long, 1.5–1.8 mm. wide, 2–3-awned, the marginal hairs all antrorse except rarely one or two at extreme base; awns 2.8–3.7 mm. long, barbed both ways, upward at base, downward or both ways in middle, upward or downward at apex.—Massachusetts: Tidal shore of Merrimac River, Amesbury, 22 Sept., 1928, *Blake* 10784A (type in U. S. National Herbarium, no. 1,365,546).

Of this form only a single plant was found, so robust that it provided material for about ten sheets. Its characters, in connection with its occurrence in company with typical *Bidens eatoni* Fernald with downwardly barbed awns and var. *fallax* Fernald with upwardly barbed awns, might lead to the suspicion that it represented a hybrid between them. The only other form of *Bidens eatoni* with awns barbed in both directions, var. *mutabilis* Fassett[2] from the Kennebec River, Maine, is, however, found in a region where no other form of the species except one with downwardly barbed awns is known to occur. Var. *mutabilis*, of which I have examined the type material in the Gray Herbarium, differs from var. *illicita* in its very short awns (only 0.5–2 mm. long) and in the fact that the angles of the achene are barbed both retrorsely and antrorsely.—S. F. Blake, Bureau of Plant Industry, Washington, D. C.

[1] Hackel, The True Grasses, transl. Scribn. & Southw. 18 (1890).
[2] Rhodora 27: 143. 1925.

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THE IDENTITY OF CLADONIA LEPIDOTA FRIES

C. A. Robbins

(Plate 187)

The plant determined by Fries as *C. lepidota* has occupied an interesting as well as an uncertain position almost from the first. The name chosen for it was unfortunate, having been used previously by several authors for an entirely different plant of somewhat doubtful relationship, first described by Acharius[1] as *Cenomyce gonorega* f. *lepidota*.

Fries considered the plant a good species and Tuckerman, who believed that "the interest in the study of Lichens lies in the resolution rather than in the over-estimation of differences" saw nothing in it to indicate a relationship between it and any other and therefore gave to it a specific name in his herbarium before he accepted the one proposed for it by Fries.[2]

Two authorities, however, have assumed a relationship for it and both find it in the typically scarlet-fruited *C. cristatella*. Nylander, whose *C. substramina* was published in 1860, based his species upon the ochrocarpous form of *C. cristatella* to which he added a specimen of *C. lepidota* sent him by Tuckerman. Wainio[3] referred to *C. cristatella*, as f. *lepidifera*, plants sent him from New Bedford by Henry Willey as *C. lepidota*, considering Fries' "nomen ineptum ob confusionem cum *C. lepidota* Nyl."

Willey did not agree with Wainio's disposition of the plant. Like Tuckerman and Fries he was convinced that it deserved specific

[1] Syn. Meth. Lich. 259. 1814.
[2] *Cladonia lepidota* Fr. ex Tuckerman, Syn. Lich. 1: 249. 1882.
[3] Wainio, Act. Soc. Faun. Fl. Fenn. 10 (Mon. Clad. 2): 446. 1894.

rank as is shown by the labels he attached to specimens in his herbarium. His collection, now in the United States National Herbarium, contains five packets of mounted plants, all from Massachusetts: No. 1, from Essex County; Nos. 2, 3 and 5 from New Bedford; No. 4, from Weymouth. The specimens in packets Nos. 2 and 4 are accompanied by place data only. The others are labeled by Willey with an unpublished specific name based on Wainio's form name. In packet No. 3, in Willey's hand, occurs the note "According to Wain. Monog. Cladon. P. 2, p. 446 *Cl. lepidota* Fr. is f. *lepidifera* Wain. of *Cl. cristatella* var. *ochrocarpia* Tuck. But I do not agree."

To one who is familiar with the plant it is plain that Willey's disagreement was well-founded. *C. cristatella* is typically a scarlet-fruited species. Fries' plant is typically a brown-fruited species. Examples of the var. *ochrocarpia* are to be met with in which the yellowish or pale- to darker-brown apothecia shade into the typical scarlet coloration and there is, therefore, no question concerning Tuckerman's correctness in disposing of that plant as he did. Fries' *C. lepidota* does not show transitional changes of the kind; the apothecia are constantly pale- to darker-yellowish or brownish and there is nothing to indicate its position to be elsewhere than under Sect. *Ochrophaeae* of Wainio's arrangement of the genus. Moreover, there is a difference in chemical reaction. *C. cristatella*, in all states of development, yields no response except, perhaps, a brightening of the individually dominant color to KOH, either alone or in combination with CaCl. The other yields a distinct and immediate yellow reaction to these chemicals combined. Either of these differences is sufficient to separate it from *C. cristatella*.

A study of the plant, however, will show that its specific entity is much more diverse and complicated than was indicated by any of the authorities mentioned; and that various names given it were applied to what is merely one of a group of forms, the whole constituting a distinct and widely distributed species.

C. lepidota Fries is represented in the Tuckerman herbarium by specimens from South Carolina, New Jersey, and Massachusetts. It is also recorded in the Synopsis from Mexico. With the exception of part of those from New Jersey, the plants are characterized by having the tips of the podetia broken into numerous short, subradiate segments which are minutely squamulose and minutely

fruited, the apothecia abundant. The plants from New Jersey, for the most part similar, include others with the podetia more slender and with the tips terminated by solitary, or few, comparatively large apothecia. Similar plants occur in the Willey collections from New Bedford and Weymouth.

This latter mode of development, although so meagerly represented in the two herbaria, is common throughout the plant's range. In this form the plants resemble typical forms of *C. mitrula, C. subcariosa, C. clavulifera*, etc., and even more closely, *C. cristatella* var. *ochrocarpia*. Another distinctive form has the podetia conspicuously obconical. These forms represent, possibly, the normal fertile condition of the species; the divided-tipped plants, perhaps, a less fertile condition.

Any particular type of variation may be well-defined in just-evolving plants and that form may continue through the life of that plant or adult plants may occur in which various types have developed simultaneously. In fact, almost any colony is likely to yield several connecting forms and these may vary from any one to any other; in view of which it is surprising that the Tuckerman and Willey collections show so little variation.

Fries founded *C. lepidota* upon one of the more conspicuous forms of the species; another form has recently been segregated as a species by Merrill. There is excuse for this, for while there is considerable difference in appearance between the sturdy, obconical, large-fruited plants and the slender, elongate, smaller-fruited plants (see Plate No. 187, figs. 2 and 9) there is an even greater difference between these and the divided-tipped, minutely-fruited forms (fig. 15). Yet, as before stated, all will be found to be but variations in development, bound together by the common possession of distinctive characters, as well also as by the general occurrence of a series of connecting states.

The first unpreoccupied specific name clearly applicable to the *Cladonia lepidota* of Fries is (*C.*) *piedmontensis* Merrill, and this name must be adopted for it. An amplified description of the species with a key to its common forms follows.

CLADONIA PIEDMONTENSIS Merrill, Bryologist **27:** p. 22, 1924. *C. substraminea* Nyl. Syn. Lich. p. 204. 1860 (in part); *C. lepidota* Fr. ex Tuck. Syn. 1, p. 249. 1882 (in part); *C. cristatella* f. *lepidifera* Wain. Act. Soc. Faun. Fl. Fenn. **10:** (Mon. Clad. **2**) 446. 1894. Primary squamules small, rounded, flat, entire but becoming some-

what elongate or expanded with rounded or sublinear segments, yellowish to yellowish-green above, white or faintly yellowish beneath, KOH (CaCl) + (above and beneath); podetia yellowish, yellowish-green or yellowish-glaucescent, 20–30(–40) mm. tall, simple or branched, obconical, club-shape or somewhat elongate-cylindrical, the tips somewhat expanded and terminated by medium-size to comparatively large apothecia or with the tips somewhat thickened and divided into numerous short, subradiate, minutely-fruited segments, the apothecia abundant or rarely with the tips rather slender and sterile, corticate, the cortex continuous to areolately dispersed, smooth, rugose or warty, often becoming cracked or flaky and squamule-forming, impellucid, often somewhat pruinose, squamulose or esquamulose, neither sorediate nor granulose; KOH (CaCl) +; axils closed and rarely somewhat abortively cup-forming; apothecia pale-yellowish or yellowish-brown to light- or dark-brown.—The species is most easily distinguished from similarly constructed species by the color or from *C. cristatella* var. *ochrocarpia*, which it resembles in this respect (as well also from all others which it resembles in construction) by its chemical reaction. The divided-tipped form is unique. When growing, the colony of small, rounded, yellowish primary squamules is conspicuous and characteristic. It has been found in Massachusetts and Connecticut, south to Maryland, Virginia, West Virginia, North Carolina, South Carolina, Alabama and, according to Tuckerman, Mexico. It occurs on rich humus, sandy loam or sand and (more rarely) on decaying and decayed wood. The following are common variations.

Podetia none, the apothecia sessile on, or short-stipate from, the surface and margins of the primary squamules . . . . . f. **epiphylla** f. nov.
Podetia normally developed.
  Podetial squamules none or basal.
    Podetia stout, obconical, the apothecia comparatively large, terminal. . . . . f. **obconica** f. nov. (figs 1, 2, 3.)
    Podetia club-shape to clyindrical, often slender, some of the apothecia medium-size and solitary, others minute and densely clustered, the latter axillar as well as terminal.
      f. **intermedia** f. nov. (figs. 8, 9, 10).
  Podetial squamules present.
    Podetia stout, obconical, the squamules uniform, the apothecia comparatively large, terminal. (Analogous to f. *obconica*.)
      f. **squamulosa** f. nov. (figs. 4, 5, 6, 7).
    Podetia club-shape or cylindrical, often slender, some of the apothecia medium-size and solitary, others minute and densely clustered, the latter axillar as well as terminal. (Analogous to f. *intermedia*) . . . . . f. **phyllocoma** f. nov. (figs. 11, 12).
  Podetia cylindrical, the apical squamules much reduced and scale-like; tips somewhat expanded and divided into numerous, short, subradiate, minutely-fruited segments, the apothecia abundant.
    f. **lepidifera** (Wain.) Robbins n. comb. (figs. 14, 15, 16, 17, 18).
  Podetia densely squamulose throughout, the squamules uniform; tips sterile or sparsely fruited . . f. **squamosissima** f. nov. (fig. 13).

The greater part of the specimens in the Tuckerman collection in

the Farlow Herbarium, Harvard University (labeled *C. Oakesii* and *C. lepidota*) and in the Willey Collection in the National Herbarium (labeled *C. lepidifera*) are similar to the form pictured in fig. 15 but both collections also contain a few plants similar to those in fig. 9. The ff. *obconica* and *squamulosa* are somewhat remote from f. *lepidifera* but are connected with it through the ff. *intermedia* and *phyllocoma*. These last have the much-divided fruited segments characteristic of the f. *lepidifera* but with these they also simultaneously develop the larger apothecia, borne on clavate or obconical tips, characteristic of the ff. *obconica* and *squamulosa*. Slender states of f. *obconica* are often almost exact counterparts of *C. cristatella* var. *ochrocarpia*. The f. *squamosissima*, apparently rarer, is densely squamulose and rather sterile.

In southeastern Massachusetts there is to be found a plant often associated with the preceding and which might rather easily be mistaken for one of its forms, particularly when it occurs in an unassociated colony. It may be described as follows:

C. simulata sp. nov.; primary squamules small to medium-size, rarely quite enlarged, the margins entire or with rounded to somewhat linear and often incised segments, greenish to yellowish-green above, white beneath, KOH−, CaCl− (in combination −); podetia yellowish-green or yellowish-glaucescent to glaucescent, 10–30 mm. tall, irregularly cylindrical, often more or less fissured, usually branched, the branches short, lateral or terminal, ascending or occasionally quite horizontal, the sterile apices often naked, corticate, the cortex persistent, especially basally, or often dispersed above and passing into small to minute, subpeltate squamules, neither sorediate nor granulate; KOH −, CaCl − (in combination −); apothecia light- to dark-brown, often blackish, minute to medium-size, clustered or scattered.—TYPE from rich humus and decayed wood, Wareham, Massachusetts. The plant has also been found in North Carolina by Dr. A. W. Evans. The species closely resembles *C. piedmontensis* f. *lepidifera* but is readily distinguished from that plant by its minus chemical reaction. It also suggests a small *C. squamosa* and even more so forms of *C. pityrea* to which it is obviously nearly related. It differs from both these species in color.

Specimens of *C. simulata* and of forms of *C. piedmontensis* have been deposited in the Osborn Botanical Laboratory, Yale University; the Farlow Herbarium, Harvard University; and the United States National Herbarium.

In preparing these notes the writer is under obligations to Dr. S. F. Blake and Professor A. W. Evans for helpful suggestions and

criticisms; to Dr. C. W. Dodge for assistance in the herbarium and to Dr. William R. Maxon, whose courtesy made possible the examination of Willey's specimens.

ONSET, MASSACHUSETTS.

EXPLANATION OF PLATE 187

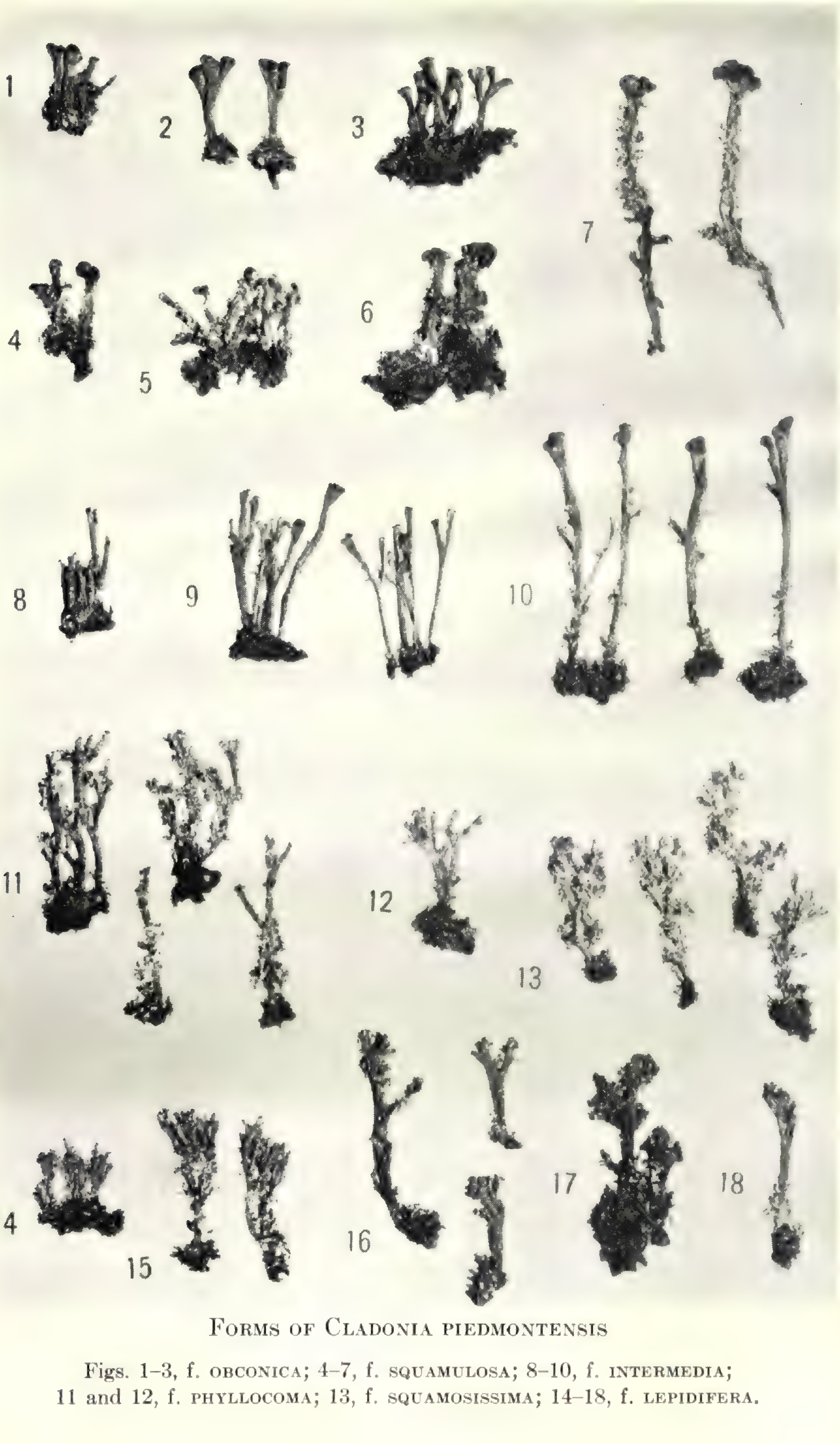
CLADONIA PIEDMONTENSIS Merrill. Fig. 1, young plants (f. OBCONICA), Carver, Mass. *C. A. Robbins*, May, 1928; fig. 2, normally developed plants (f. OBCONICA), Carver, Mass. *C. A. Robbins*, May, 1928; fig. 3, normally developed plants (f. OBCONICA), Tryon, North Carolina, *A. W. Evans*, December, 1927; fig. 4, young plant (f. SQUAMULOSA), Washington, D. C., *S. F. Blake*, February, 1925; fig. 5, young plants (f. SQUAMULOSA), Prospect Hill, Fairfax County, Virginia, *S. F. Blake*, February, 1925; fig. 6, robust plants (f. SQUAMULOSA), High Point, North Carolina, *W. M. Tyler*, February, 1928; fig. 7, elongate plants (f. SQUAMULOSA), Charlotte, North Carolina, *F. W. Gray*, October 1924, (No. 388, *F. W. G.* in herb. Merrill, in Farlow Herbarium, Harvard University, *C. piedmontensis* Merrill, Bryologist, March, 1924. TYPE.); fig. 8, young plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 9, normally developed plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 10, elongate plants (f. INTERMEDIA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 11, normally developed plants (f. PHYLLOCOMA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 12, normally developed plants (f. PHYLLOCOMA), Fairhope, Alabama, *A. W. Evans*, February, 1925 (Herb. Yale Univ. No. 161); fig. 13 (f. SQUAMOSISSIMA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 14, young plants (f. LEPIDIFERA), Carver, Mass., *C. A Robbins*, May, 1928; figs. 15 and 16, normally developed plants (f. LEPIDIFERA), Carver, Mass., *C. A. Robbins*, May, 1928; fig. 17, robust plants (f. LEPIDIFERA), Washington, D. C., *S. F. Blake*, March, 1925; fig. 18, normally developed plants (f. LEPIDIFERA), Burnt Mills, Maryland, *S. F. Blake*, February, 1926.

POLYGONELLA ARTICULATA (L.) Meisn., forma **atrorubens**, n. f., perianthiis atrorubentibus.—NEW HAMPSHIRE: sandy plains and borders of sandy woods, Nashua, October 3, 1928, *Fernald & Svenson*, no. 896 (TYPE in Gray Herb.).

The perianths of *Polygonella articulata* (generally known on the New England coast as "HEATHER") are ordinarily a delicate rosy-pink or pinkish-white or occasionally white. On the sand plains about Nashua the plant is so striking, on account of its intense dark-red or blackish-red color as to attract immediate attention.—M. L. FERNALD, Gray Herbarium.

SEVENTH REPORT OF THE COMMITTEE ON FLORAL AREAS.

THE present report deals with the first three tribes of the *Gramineae* in the Manual order, *Maydeae*, *Andropogoneae*, and *Paniceae*,



FORMS OF CLADONIA PIEDMONTENSIS

Figs. 1–3, f. OBCONICA; 4–7, f. SQUAMULOSA; 8–10, f. INTERMEDIA; 11 and 12, f. PHYLLOCOMA; 13, f. SQUAMOSISSIMA; 14–18, f. LEPIDIFERA.

plus a single introduced species of the *Zoysieae*. Certain of the *Paniceae* offer considerable taxonomic difficulties and some questions of nomenclature, which require preliminary attention.

Those relating to the genus *Paspalum* have been elsewhere discussed (RHODORA xxx. 133 (1928)). As to *Panicum*, we are inclined heartily to second the remark of Professors Wiegand and Eames (Cornell Univ. Agric. Exp. Sta. Mem. xcii. 83 (1926)) that "the separation of species . . . on the basis of degree of pubescence is to be regretted." Hitchcock and Chase have rendered invaluable service in patiently tracking down the types of all such proposed species and definitely placing them in a taxonomic scheme. Many of them they have reduced to synonymy. After a long pursuit of vanishing "characters" through a maze of slightly differing herbarium specimens, we suspect that the reduction might profitably be carried further. Are there any real specific lines between *P. columbianum*, *P. tsugetorum*, and *P. subvillosum; P. meridionale* and *P. albemarlense?* Where does *P. columbianum*, var. *thinium* leave off and *P. meridionale* begin? Was Bicknell, a keen observer and by no means averse to recognizing close species, right in reducing *P. oricola* to *P. meridionale* and in maintaining *P. Owenae;* or are Hitchcock and Chase, fortified by long monographic study of the genus, correct in reducing *P. Owenae* and retaining *P. oricola?*

Such questions we have, for the most part, been unable to answer satisfactorily; we have, as the most practicable method, here maintained, at least as varieties, nearly all the species recognized in recent treatments, so far as we are able to make them out in the material at hand. We have, however, accepted with a good deal of relief Prof. Fernald's telescoping of *P. Lindheimeri*, *P. huachucae*, etc., into a single species. This arrangement gives, in New England, natural ranges; and it is conducive to ease in naming specimens, a quality which should appeal strongly to anyone condemned to struggle with this group. We have followed Dr. Hitchcock's earlier reduction of *P. Clutei* to synonymy under *P. mattamuskeetense* in preference to his later re-separation of the two. *P. oligosanthes* we have omitted altogether. Material of it from the southeastern states is at least varietally distinct from *P. Scribnerianum*, and the latter may stand as a species, as species go in *Panicum;* but the New England collections referred to *P. oligosanthes* appear to us to represent only slender states of *P. Scribnerianum*. New England reports of *P. lucidum* seem also to be erroneous.

In volume xiv of RHODORA, Mr. F. T. Hubbard published an article in which, in the course of applying the provision of the International Rules that no name shall be rejected because of the existence of an earlier homonym which is universally regarded as non-valid, he made several changes in the Manual names of species of *Panicum*. At the time, we, in common with other New England botanists, accepted these changes; but recent examination of the evidence and experience with nomenclatorial questions since 1912 have convinced us that, in most cases, we all gave to the rule in question a more liberal interpretation than its authors intended or than is desirable. We are now of the opinion that the phrase "universally regarded" should be taken quite strictly and literally, as applying only to cases in which there is no reasonable doubt.

Three instances may serve as illustrations of what we mean. Mr. Hubbard revived *Panicum debile* Ell. (1816) for *P. verrucosum* on the ground that its earlier homonym, *P. debile* Desf. (1798), had been definitely reduced to synonymy under *Digitaria sanguinalis*. But in so comparatively recent and so authoritative a work as Richter's Plantae Europaeae (1890), *P. debile* Desf. is maintained as a full species and under *Panicum* (p. 25). It is, therefore, as we see it, not *universally* regarded as a synonym and is an effective bar to the use of *P. debile* Ell. Hence we have returned to *P. verrucosum*—incidentally a far more appropriate name.

Again, Mr. Hubbard took up *P. macrocarpon* Torr. (1824) in place of *P. Scribnerianum* Nash, for the reason that the earlier *P. macrocarpon* LeConte (1819) was a synonym of *P. latifolium* L. Its reduction depends, however, wholly on Dr. Hitchcock's typification of *P. latifolium*[1] which, like so many Linnaean species, contained more than one thing. We see no cause to question Dr. Hitchcock's assignment of the name; but it is not that in use for a long time previously and can hardly yet be said to have been universally accepted. We accordingly use *P. Scribnerianum*, about which there is nothing doubtful.

On the other hand, *P. elongatum* Salisb. Prod. 18 (1812) is absolutely invalid, being merely a renaming of the valid *P. italicum* L., and is therefore no bar to the use of *P. elongatum* Pursh (1814), which we here take up in place of *P. stipitatum* Nash.

Stuntz (U. S. Dept. Agr. Bur. Pl. Ind. Invent. Seeds and Pl.

[1] See Cont. Nat. Herb. xii. 118 (1908).

Import. xxxi. 84 (1914)) has taken up for *Setaria glauca* (L.) Beauv. the name *Chaetochloa lutescens*, based on *Panicum lutescens* Weigel (or Willich), 1772,[1] on the ground that *P. glaucum* L. properly applies to the pearl millet, *Pennisetum americanum* (L.) Schum. He has been followed by Hitchcock and Chase (Cont. Nat. Herb. xxii. 165 (1920)) and Hubbard (RHODORA xviii. 232 (1916)), who made the transfer of Stuntz's name to *Setaria*. Stapf, however (Kew Bull. Misc. Inform. 1928, no. 4, 147), argues that though the two citations under *P. glaucum* proper in the first edition of the Species Plantarum refer to *Pennisetum americanum* and *Elytrophorus articulatus* respectively, Linnaeus himself, in Syst. ed. x. 870 (1758) and in the second edition of the Species Plantarum, redefined *P. glaucum* so as to make it apply to a plant which he had treated as var. γ in the first edition, but to which the specific name *glaucum* has ever since 1758 been attached; and that Linnaeus's decision should stand.

It may be doubted whether Linnaeus's action in shifting a name from what he had originally treated as the typical portion of the species concerned to what he had originally treated as a variety can properly be maintained under present-day nomenclatorial technique, however desirable it may be to maintain it. But, as Dr. Stapf indicates, the technical status of *P. lutescens* is at least as much open to doubt. Weigel, describing the differences between two species which grew in the fields about Stralsund, remarks that he *should have called* one *lutescens* ("*lutescens* nominaverim"; italics partly ours), while the other might answer to the name of *virescens*. He then goes on to say that *lutescens* is quite the same as *Panicum glaucum* L. (*i. e.*, *P. glaucum* of the Systema, ed. x and the second edition of the Species Plantarum); and he nowhere directly makes the combination *Panicum lutescens*, though, in most cases, he carefully uses "*Panicum*" or "*P.*" before the specific name when citing the Linnaean species. This is very half-hearted publication; we doubt if it is publication at all.

Of course, even though Weigel's name were completely invalid, Stuntz would have had the right, under the International Rules, to take it up and validate it, had no other names intervened between 1772 and 1914. But there are at least six such names (Richter, Pl. Eur. i. 27). There is, indeed, something the matter with the

[1] The work in question, Observationes Botanicae, is apparently an academic dissertation, similar to those published by Linnaeus in the Amoenitates, done by a student named Willich under the direction of Weigel.

earlier of them. *P. cynosuroides* Scop. (1778) is, nomenclatorially, a transfer of *P. alopecuroides*, *A. cynosuroides* L. Syst. ed. x. ii. 870 (1759), the identity of which no one knows; *P. luteum* Georgi (1791) is, according to the Index Kewensis, a *nomen nudum; P. flavescens* Moench (1794) is antedated by *P. flavescens* Sw. (1788). However, *P. pumilum* Poir. Encycl. Suppl. iv. 273 (1797), transferred to *Setaria* by Roem. & Schult. Syst. ii. 891 (1817) appears to be clear of impediment (provided it can be proved a synonym of *S. glauca;* Hitchcock (Cont. Nat. Herb. xxii. 168) refers it with doubt to *S. geniculata*) and it is hereby freely offered to anyone who cares to apply another name to the species. Pending a conclusive threshing out of the matter by grass specialists, we cheerfully follow Stapf in retaining the familiar *S. glauca.*

Limitation of space prevents detailed enumeration of botanists from whom we have had help; but all have our thanks. In the preparation of this particular report, the active interest of Mr. S. N. F. Sanford and of Prof. J. F. Collins has been especially valuable. And we should be ungrateful indeed if we did not now and then make acknowledgment of our continuing debt to Prof. Fernald's unrivalled knowledge of the northeastern flora and his patient editorial attention to our work.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS—XXXII.

The sign + indicates than an herbarium specimen has been seen; the sign − that a reliable printed record has been found.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
I. MAYDEAE.						
Tripsacum dactyloides L.					+	+
Zea Mays L.	+	−	+	+	+	
II. ANDROPOGONEAE.						
Andropogon furcatus Muhl.	+	+	+	+	+	+
" glomeratus (Walt.) BSP.				+		
" scoparius Michx.				+		+
" " " var. frequens Hubb.	+	+	+	+	+	+
" " " " polyclados Scribn. & Ball				+		+
" virginicus L.				+	+	+
Miscanthus sinensis Anderss.				+		+
Sorghastrum nutans (L.) Nash	+	+	+	+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Sorghum caffrorum Beauv.				+		+
" halepense L.				+		+
III. Zoysieae.						
Tragus racemosus Hall.	+			+		
IV. Paniceae.						
Cenchrus echinatus L.				+		
" pauciflorus Benth.	+	+	+	+	+	+
Digitaria filiformis (L.) Koeler		+		+	+	+
" Ischaemum Schreb.	+	+	+	+	+	+
" laeviglumis Fernald		+				
" sanguinalis (L.) Scop.	+	+	+	+	+	+
Echinochloa crus-galli (L.) Beauv.	+	+	+	+	+	+
" " " " f. longiseta (Trin.) Wiegand	+		+	+	+	+
" " " " f. vittata Hubbard				+		
" frumentacea (Roxb.) Link	+	+		+		+
" muricata (Michx.) Fernald	+	+		+	+	+
" " (Michx.) Fernald var. microstachya Wiegand	+	+	+	+	+	+
" " (Michx.) Fernald var. occidentalis Wiegand	+	+		+	+	
" Walteri (Pursh) Nash				+	+	+
" " " " f. laevigata Wiegand				+		
Leptoloma cognatum (Schultes) Chase		+	+			+
Panicum aculeatum H. & C.						+
" agrostoides Spreng.	+	+	−	+	+	+
" albemarlense Ashe				+	+	+
" amarum Ell.						+
" annulum Ashe				+		
" Ashei Pearson				+	+	+
" auburne Ashe				+		
" Bicknellii Nash				+		+
" boreale Nash	+	+	+	+		+
" Boscii Poir.		−		+		+
" " " var. molle (Vasey) H. & C.						+
" calliphyllum Ashe				+		
" capillare L.	+	+	+	+	+	+
" " " var. occidentale Rydb.	+	+	+	+	+	+
" clandestinum L.	+	+	+	+	+	+
" columbianum Scribn.	+	+	−	+	+	+
" " " var. thinium H. & C.				+	+	+
" Commonsianum Ashe				+		+
" " Ashe var. Addisonii (Nash) Stone				+		+
" commutatum Schultes				+		
" depauperatum Muhl.	+			+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Panicum depauperatum Muhl. var. psilophyllum Fernald	+	+	+	+	+	+
" dichotomiflorum Michx.	+	+		+	+	+
" dichotomiflorum Michx. var. puritanorum Svenson				+	+	
" dichotomum L.	+	+	+	+	+	+
" " " var. barbulatum (Michx.) Vasey			−	+	+	+
" elongatum Pursh						+
" lanuginosum Ell.					+	
" latifolium L.	+	+	+	+	+	+
" Lindheimeri Nash	+	+	+	+	+	+
" Lindheimeri Nash var. fasciculatum (Torr.) Fernald	+	+	+	+	+	+
" Lindheimeri Nash var. implicatum (Scribn.) Fernald	+	+	+	+	+	+
" Lindheimeri Nash var. septentrionale Fernald	+	+	+	+	+	+
" linearifolium Scribn.	+	+	+	+	+	+
" linearifolium Scribn. var. Werneri (Scribn.) Fernald	+	+	+	+	+	+
" longifolium Torr.				+	+	+
" mattamuskeetense Ashe				+	+	
" meridionale Ashe				+	+	+
" microcarpon Muhl.				+	+	+
" miliaceum L.	+	+	+	+	+	+
" oricola H. & C.				+	+	+
" Owenae Bickn.				+		
" philadelphicum Bernh.				+	+	+
" polyanthes Schult.				+		+
" pseudopubescens Nash						+
" scoparioides Ashe			−	+		+
" scoparium Lam.				+	+	
" Scribnerianum Nash	+	+	+	+	+	+
" sphaerocarpon Ell.		−	+	+	+	+
" spretum Schultes	+	+		+	+	+
" subvillosum Ashe	+	+	+	+		+
" texanum Buckl.				+		
" tsugetorum Nash	+	+	+	+	+	+
" Tuckermani Fernald	+	+	+	+	+	+
" verrucosum Muhl.				+	+	+
" villosissimum Nash				+	+	+
" virgatum L.		+	+	+		+
" " " var. spissum Linder	+	+		+	+	+
" Wrightianum Scribn.				+		
" xanthophysum Gray	+	+	+	+		+
Paspalum circulare Nash						+
" psammophilum Nash				+	+	+
" pubescens Muhl.		+	+	+	+	+
" setaceum Michx.				+	+	+
Setaria geniculata (Lam.) Beauv.				+		+
" glauca (L.) Beauv.	+	+	+	+	+	+
" italica (L.) Beauv., subsp. stramineofructa Hubbard	+	−		+		+
" italica (L.) Beauv., subsp. stramineofructa Hubbard, subvar. germanica (Mill.) Hubbard	+			+	+	+

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Setaria italica (L.) Beauv., subsp. stramineofructa Hubbard, var. Hostii Hubbard	+			+		+
" italica (L.) Beauv., subsp. stramineofructa Hubbard, subvar. Metzgeri (Körnicke) Hubbard	+	+	+	+	+	+
" verticillata (L.) Beauv.		−	+	+	+	+
" viridis (L.) Beauv.	+	+	+	+	+	+
" viridis (L.) Beauv. var. Weinmannii (R. & S.) Brand	+	+	+	+		

The following references will help to account for names in the above list which are not in the Manual or are there used in different categories: Bicknell, Bull. Torr. Bot. Club xxv. 185 (*Panicum Owenae*); Chase, Cont. Nat. Herb. xxii. 67 (*Cenchrus pauciflorus*); Fernald, Rhodora xxi. 110 (*Panicum Tuckermani* and *P. capillare*, var. *occidentale*); xxii. 102 (*Digitaria laeviglumis*), xxiii. 193, 194, 227 (*Panicum depauperatum*, var. *psilophyllum*, *P. linearifolium*, var. *Werneri*, *P. Lindheimeri* and vars.); Fernald & Wiegand, Rhodora xii. 133 (*Setaria viridis*, var. *Weinmannii*); Hitchcock, Cont. Nat. Herb. xxii. 168 (*Setaria geniculata*); Hitchcock & Chase, Cont. Nat. Herb. xv. 94 (*Panicum amarum*); Hubbard, Rhodora xviii. 231, 232 (*Digitaria Ischaemum*, *Setaria viridis*, var. *Weinmannii*), Am. Journ. Bot. iv. 169 (varieties of *Setaria italica*); Linder, Rhodora xxiv. 11 (varieties of *Panicum virgatum*); Stone, Pl. So. New Jersey 505 (*Panicum Commonsianum*, var. *Addisonii*); Svenson, Rhodora xxii. 154 (varieties of *Panicum dichotomiflorum*); Vasey, Bull. U. S. Dept. Agric. Div. Bot. viii. 30 (*Panicum dichotomum*, var. *barbulatum*); Wiegand, Rhodora xxiii. 49 (*Echinochloa*).

Of the rarer introduced species in our list, *Miscanthus sinensis* has been found at Boston and Worcester, Mass., and Greenwich, Conn.; *Tragus racemosus* at North Berwick, Maine (Parlin) and South Boston (C. E. Perkins); *Panicum texanum* in cotton waste at Malden (F. S. Collins); and *Cenchrus echinatus* at Lowell (Swan). The Sorghums are occasionally spontaneous in southern New England and *Zea Mays* as far north as New Hampshire. The other foreign species are more or less well-known weeds, some of them only too familiar.

Geographically, the groups here considered are notable for the great preponderance of southern species. There is none which, in New England, is strictly northern; the majority are either found chiefly in the three southern states or are entirely confined to them.

The geographic arrangement follows closely the lines of previous reports, with one exception. We are recognizing tentatively a new group, under the caption "Chiefly east of the Connecticut." The species assigned to it are not found west of the Connecticut Valley except in southern Connecticut; they do not reach northern New Hampshire; and in Maine they do not penetrate much, if any, north of the 45th parallel. Their collective range dovetails almost perfectly with that of the calcicolous group (see RHODORA xxii. 87); herein may be found a hint as to the reason for their peculiar distribution. They are probably plants of strongly acid soils, and such soils are found more abundantly in eastern New England than in western and northern, where calcareous areas are frequent.

In addition to the species here enumerated, *Solidago uniligulata* belongs with this group (see RHODORA xxvii. 65).

I. GENERALLY DISTRIBUTED.—*Andropogon scoparius*, var. *frequens; Panicum Lindheimeri*, var. *fasciculatum; P. capillare*, var. *occidentale; P. linearifolium*.

Only two of the above have an absolutely general distribution. *Andropogon scoparius*, var. *frequens* and *Panicum linearifolium* are not known in southeastern Maine east of the Penobscot Valley, nor near the coast east of the Kennebec. The former is also absent from the Sandy River valley in Franklin Co., Maine.

II. RATHER GENERAL EXCEPT IN SOUTHEASTERN MASSACHUSETTS.—*Panicum boreale; P. Lindheimeri*, var. *septentrionale; P. Tuckermani*.

Panicum boreale has not been found in Rhode Island, but in all probability actually occurs there, since it is known from several stations in eastern Connecticut, some of them very near the state line.

III. RATHER GENERAL EXCEPT IN NORTHERN MAINE.—*Andropogon furcatus; Panicum agrostoides; P. capillare; P. clandestinum; P. depauperatum*, var. *psilophyllum; P. dichotomum; P. latifolium; P. Lindheimeri*, var. *implicatum; P. linearifolium*, var. *Werneri; P. tsugetorum; Sorghastrum nutans*.

Of the species here included, two only—*Panicum latifolium* and *P. Lindheimeri*, var. *implicatum*—have what may be called the standard range for this group. None of the others reach extreme southeastern Maine, and *Andropogon furcatus* is absent also from the coastal region east of the Kennebec. *Panicum agrostoides*, *P.*

dichotomum, and *Sorghastrum nutans*, though reaching the Penobscot Valley, have, so far as the specimens at hand show, comparatively few and scattered stations north of the 43rd parallel. *Panicum tsugetorum*, though getting well north in the Champlain Valley, is not known to us in Maine east of the Androscoggin. These four species constitute a transition to Group V, and would go almost as well in it.

In the other direction, *Panicum latifolium* and *P. linearifolium*, var. *Werneri* thin out notably in southeastern Massachusetts. They have but one station each on Cape Cod and are not known from Nantucket or Martha's Vineyard. This is readily enough accounted for in the case of the former, a species of rocky woodlands; the reason for the latter's scarcity in this region is not so obvious.

IV. Chiefly East of the Connecticut.—*Echinochloa muricata; Panicum depauperatum; P. spretum; P. virgatum*, var. *spissum*.

The typical forms of *Panicum depauperatum* and *Echinochloa muricata* have only lately been segregated from other varieties and are, of course, not recognized in any but the most recent local floras. Further data may show that they (and especially the former) do not belong in this group.

V. Chiefly the Three Southern States.—*Andropogon virginicus; Cenchrus pauciflorus; Digitaria filiformis; Panicum Ashei; P. Boscii; P. Boscii*, var. *molle; P. columbianum; P. dichotomiflorum; P. dichotomum*, var. *barbulatum; P. elongatum; P. Lindheimeri; P. microcarpon; P. philadelphicum; P. Scribnerianum; P. sphaerocarpon; P. villosissimum; Paspalum circulare; P. pubescens; P. setaceum*.

Nothing could better illustrate the difficulty of making any hard and fast geographic classification of New England plants than the species here included. Most of them are of obvious geographic affinity, as their ranges outside of New England show.[3] But within our area, their distribution varies extraordinarily in detail. Some connect closely with group III; some, at the other extreme, penetrate no farther than Connecticut; and there is nearly every possible

[3] These are, very uniformly, Maine, Massachusetts or Connecticut to Nebraska, Kansas or Missouri and southward. The exceptions are: *Cenchrus pauciflorus*, which is a widely distributed weed in the United States; *Panicum Scribnerianum*, which extends across the continent to Washington and south in the central United States to Texas, but is not known in the southeastern states; and *P. columbianum*, which is reported only from the coastal states and only as far south as Virginia. However different these may be in their ranges outside New England, within it they can only be placed in this group.

gradation between. Perhaps we shall know some time why, of several species of like general range and soil preference, all reaching their northeastern limits in New England, some should stop at one point, some a few miles beyond, and so forth—if, indeed, any other element than chance is involved.

The supplementary tables which follow give a graphic idea of this gradual shading off of ranges, and also of the rather irregular distribution of known stations north of latitude 43. For the sake of fullness and to show how not only the ranges of species but the groups themselves grade into one another, four transitional species from group III are included in table 2. The signs + and − have the same significance as in the main table at the beginning of this report.

Table 2. SPECIES WITH OUTLYING STATIONS NORTH OF 43°.

The abbreviations at the heads of the columns, taken from left to right, signify respectively the Champlain, Connecticut, Merrimac, Androscoggin, and Penobscot valleys.

	Champ.	Conn.	Merr.	Saco	Andr.	Penob.
Sorghastrum nutans	+	+			+	+
Panicum dichotomum	+		+	−		+
" agrostoides		−	+	+	+	+
" tsugetorum	+	+	+	+	+	
" Lindheimeri	+				+	
" dichotomiflorum				+		
Cenchrus pauciflorus	+	+	+			
Panicum columbianum	−		+			
Paspalum pubescens		+	+			
Panicum dichotomum var. barbulatum	−		+			
Panicum Scribnerianum		+	+			

A majority of the above species are generally distributed in the three southern states. *Panicum dichotomum*, var. *barbulatum*, *P. dichotomiflorum*, *P. Lindheimeri*, and *P. Scribnerianum*, however, are not found in Massachusetts west of the Connecticut Valley, and *P. Lindheimeri* is not known from Cape Cod. *Cenchrus pauciflorus* is said by Mrs. Flynn to be only introduced about Burlington (Contr. to the Botany of Vermont ix. 11 (1911)).

Panicum Boscii is reported from Maine in the Manual, but as that record is omitted in Hitchcock and Chase's Monograph of Panicum, it is probably erroneous and no account of it is here taken.

TABLE 3. SPECIES WITH NO STATIONS NORTH OF 43°.

	Conn.	R. I.	Mass. s. e. Cos.	Mass. n. e. Cos.	Mass. Conn. Valley	Mass. Berk. Co.
Digitaria filiformis	+	+	+	+	+	+
Panicum sphaerocarpon	+	+	+	+		+
" Ashei	+	+	+	+		+
" philadelphicum	+	+				+
Andropogon virginicus	+	+	+	+	−	
Panicum microcarpon	+	+	+	+		
" villosissimum	+	+	−	+		
" Boscii	+	+		+		
Paspalum setaceum	+	+	+			
Panicum polyanthes	+		+			
" Boscii, var. molle	+					
Paspalum circulare	+					
Panicum elongatum	+					

VI. COASTAL PLAIN.—*Andropogon glomeratus; A. scoparius; A. scoparius*, var. *polyclados; Echinochloa Walteri; Panicum albemarlense; P. annulum; P. auburne; P. Bicknellii; P. columbianum*, var. *thinium; P. Commonsianum; P. Commonsianum*, var. *Addisonii; P. dichotomiflorum*, var. *puritanorum; P. lanuginosum; P. longifolium; P. mattamuskeetense; P. meridionale; P. oricola; P. Owenae; P. polyanthes; P. scoparium; P. verrucosum; P. Wrightianum; Paspalum psammophilum.*

In this group also there is considerable variation in details of range. *Panicum meridionale* extends north to Essex County, Massachusetts, and in the Connecticut Valley to Springfield. *Echinochloa Walteri, Panicum columbianum*, var. *thinium, P. Commonsianum*, var. *Addisonii*, and *P. oricola* reach northeastern Massachusetts, but not Springfield, though the second and third ascend the Connecticut to the vicinity of Hartford. *Panicum albemarlense* and *P. verrucosum* occur at Springfield, but not in northeastern Massachusetts. *Paspalum psammophilum* and *Panicum longifolium* reach neither, though found in all three southern states. Typical *Andropogon scoparius* and var. *polyclados* occur in northeastern and southeastern Massachusetts and in Connecticut, but have not been reported from Rhode Island. *Panicum Bicknellii, P. Commonsianum*, and *P. polyanthes* occur in southeastern Massachusetts and in Connecticut, but, likewise, have not been detected in Rhode Island. *P. scoparium* and *P. dichotomiflorum*, var. *puritanorum* are found both in Massachusetts and Rhode Island, but not in Connecticut. The rest are restricted to southeastern Massachusetts, except *Panicum lanuginosum* which is known only from Block Island.

VII. MARITIME.—*Panicum amarum; Setaria geniculata; Tripsacum dactyloides.*

These three species are all southern and none penetrates far into New England. *Setaria geniculata* reaches Cape Cod, *Tripsacum*, Rhode Island, and *Panicum amarum* only to Old Lyme, Conn., at the mouth of the Connecticut River.

VIII. MISCELLANEOUS.—*Digitaria laeviglumis; Echinochloa muricata*, var. *microstachya; E. muricata*, var. *occidentalis; Leptoloma cognatum; Panicum aculeatum; P. calliphyllum; P. commutatum; P. pseudopubescens; P. scoparioides; P. subvillosum; P. virgatum; P. xanthophysum.*

Digitaria laeviglumis is an endemic, known only from the original station near Manchester, New Hampshire. *Panicum subvillosum* occurs in Washington County, Maine, and thence westward at scattered localities (mostly south of the 45th parallel) to the Champlain Valley, and southward to Cape Cod and New Haven, Connecticut. It is not known from most of central Massachusetts, from Rhode Island, or from the Housatonic Valley. It is apparently most frequent near the coast from Massachusetts Bay northward. Typical *Panicum virgatum* is known from central and eastern Connecticut, from the Connecticut Valley as far north as Hartland, Vermont, from a single station each in the Champlain Valley and on Cape Cod, and from three in Middlesex and Essex Counties, Massachusetts.

Panicum xanthophysum is apparently frequent from the Penobscot Valley westward, south of the 45th parallel, and southward, through the highlands of central Massachusetts to the northern townships of Connecticut, where it stops abruptly. It is not known from southeastern Massachusetts or from Rhode Island. Though somewhat more extended southward, its range is very similar to that of typical *Alisma Plantago-aquatica;* should other species prove to have a like range, a special group may have to be erected to contain them.

The other species here placed are known from too few and too irregularly scattered stations to be placed definitely in any of the groups we have recognized.

C. A. WEATHERBY
C. H. KNOWLTON
R. C. BEAN

THE GENERIC NAME RADICULA

KENNETH K. MACKENZIE

REFERRING to Prof. Fernald's article on *Roripa islandica* (RHODORA **31:** 17, 1929) I wish to raise the query whether under the Vienna (Brussels) code the name *Radicula* (Hill British Herbal 264 1756) should not be used instead of the later name *Roripa* (Scop. Fl. Carn. 520 1760).

The only reason at all for its rejection is a very arbitrary and silly provision of that code as follows:

"Art. 54. Names of genera must be rejected in the following special cases:

"1. When they coincide with a technical name concurrently used in morphology, unless they are accompanied by specific names . . .

"Examples.—Generic names such as *Lignum*, *Radix*, *Spina*, *Radicula* etc. would not now be admissible; on the other hand a generic name like *Tuber* should not be rejected when it has been published with specific names (*Tuber cibarium*, etc.)."

One can understand the logic in rejecting a name of the class referred to for the reason given, although it does not appeal to me, but it is certainly hard to understand why such a name otherwise to be rejected should become available for the reason given. If a name is objectionable because used in morphology it seems to me that it is still open to that objection if published with specific names. However, the rule is as given.

Hill did not use the binomial system, but he did give specific names both in English and in Latin under his genus *Radicula*, as follows: (1) Pinnate-leaved water Radish. *Radicula foliis pennatifidis;* and (2) Serrated-leaved water Radish. *Radicula foliis serratis.* He further illustrated both species (plate 38).

It will be noted that Hill's publication quite complied with the rule quoted, which does not require binomial specific names at all. His name of course is the proper name for those who follow priority.

Why anyone should go out of the way to invalidate such an unusually fine piece of work as Hill's publication of *Radicula* is very hard indeed to understand. Scopoli's genus *Roripa* (originally spelled *Rorippa* or *Roriopa* in the Index p. 599) (Fl. Carn. 520 1760), taken up in its place, was most superficially characterized and was soon abandoned by its author (Fl. Carn. ed. 2 **2:** 25 1772).

MAPLEWOOD, NEW JERSEY.

Vegetative Reproduction in Hydrangea.—Mr. R. J. Eaton has recently (Rhodora, January, 1929) given an interesting account of *Hydrangea paniculata* as naturalized in Massachusetts, the first time that this shrub has been recorded as naturalized in North America. It grew "in rather dense irregular clumps," "forming a veritable tangle and in full flower"; thus the plant was well established. Mr. Eaton thinks it is probable that the plants had been propagated by seed, since there was no evidence of rooting at the tips of the recurved branches, as is so well exemplified by *Rubus*. There is, however, another method of vegetative reproduction, which has been recorded from a number of species of the genus, namely by root-shoots, and this would explain its abundance and irregular vegetation described by Mr. Eaton. It would also explain in what form the plant had escaped: as a mere fragment of a root, evidently originating from a garden, where the plant had been dug up and thrown away, because it was too plentiful! It is a well known fact that plants, notably trees and shrubs, producing root-shoots, often become a pest in cultivated places, gardens, parks, etc., and we know also that roots possess a marvelous power to preserve their life and power to sprout for many years; moreover, one single root may develop many shoots during the same season.[1] We feel sure that if Mr. Eaton visits the place again and lifts some of the smaller specimens, these will prove to represent root-shoots rather than seedling-plants. If our suggestion be correct, no long period of time would have been necessary for the abundant occurrence of the *Hydrangea*, because the growth of root-shoots is enormously fast and vigorous; notice for instance *Rhus*, *Ailanthus*, *Robinia*, *Sassafras* and many others. No doubt *Hydrangea paniculata* will in the course of some years become distributed to other localities, and this first record by Mr. Eaton is therefore of great importance from a geographical point of view.—Theo. Holm, Clinton, Maryland.

[1] Compare: Holm, On the Development of Buds upon Roots and Leaves. Ann. of Botany, Vol. 39, 867–881. 1925.

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 31. July, 1929. No. 367.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY—NO. LXXXVI

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS[1]

H. K. Svenson

(Plates 188 to 191)

INTRODUCTION

It is twenty years since the publication of fragments of C. B. Clarke's monographic work on the *Cyperaceae*. Since that time extensive explorations have been made in the New World where *Eleocharis* has its greatest concentration and where the concept of species within this genus has greatly changed in the last two decades. The nomenclature which Clarke employed is in great need of revision, and, moreover, there has been a lack of critical comparison between Old World and New World forms. Of Clarke's manuscript, nothing has been published except an abstract of species arranged in systematic order and a series of illustrations of selected species from the various genera.

The present work deals with the taxonomy and geographic distribution of *Eleocharis*, a genus of the *Cyperaceae*, consisting of more than a hundred species of aquatic and semi-aquatic plants, inhabiting salt marshes, bogs, and shallow waters of ponds from the tropics to the polar regions of both hemispheres. A genus characteristically without leaves and therefore without the complex foliar variations of leafy plants, it has the photosynthetic activities transferred to the culm. The chief differentiation of species lies in the character of the

[1] A Thesis submitted in partial fulfillment of the Requirements for the degree of Doctor of Philosophy in the Division of Biology, Harvard University, 1928.

achene, and in the study of this the author has constantly employed a binocular dissecting microscope.

For assistance the author is especially indebted to Professor M. L. Fernald, under whose supervision the work was carried out, and to Dr. R. L. Robinson for his kindly advice in many matters, and to the other members of the staff of the Gray Herbarium; to Dr. F. W. Pennell for valuable assistance in the examination of the Muhlenberg, Short and Porter herbaria at the Philadelphia Academy of Sciences and for the loan of material; to Dr. P. A. Munz of Pomona College for the loan of a large collection of *Eleocharis* from the western United States, including the collection of M. E. Jones; to Dr. Gunnar Samuelsson of the Botanical Museum of Stockholm for the loan of South American and West Indian material; to the staff of the New York Botanic Garden, and especially to Dr. J. K. Small; to Dr. M. O. Malte for the loan of material from the Canadian National Museum; and to the National Herbarium at Washington for the loan of South American and Mexican specimens; and to all others who have helped in the loan of specimens and otherwise. The writer has been very fortunate in having at the Gray Herbarium authentic material of most of the species of the Old World, represented by specimens from the collections of Thwaites, Wallich, Hooker, Schweinfurth, Seemann, Mueller, Zollinger, and others, without which a treatment of *Eleocharis* would have been impossible.

From a purely nomenclatorial point of view the genus is of great interest. The name *Eleocharis* given by Robert Brown (1810), is derived from ἕλος (a marsh) and χάρις (grace) and refers to the aquatic habitat. In forming the name Brown did not include the letter "h," represented in Greek only by the rough-breathing mark. Whether *Eleocharis* or *Heleocharis* is the correct spelling has consequently been a source of contention, with continental botanists for the greater part insisting on the "h".[1] C. B. Clarke solved the problem in a very simple manner, by rejecting all combinations under *Heleocharis*, which is not, however, a method that appeals to common sense; and it has been the custom of practically all workers

[1] According to Ascherson & Graebner, Syn, i. 400, footnote 1 (1897), in discussing the similar names *Elodea* and *Helodea*, it arises from "der französischen Unsitte, den griechischen Spiritus asper unbeachtet zu lassen." Yet, withal, Ascherson & Graebner, in citing the derivation of *Eleocharis* (l c. ii. 289, footnote 1) omit the initial aspirate. Sprague, Kew Bull. Misc. Inf. 1928: 352 (1928) upholds the spelling *Eleocharis* as required by the International Rules of Nomenclature, and his remarks under *Rynchospora* (l. c. 360) are apropos.

to follow the *Index Kewensis* in treating the matter as merely a trivial variation in orthography. In the present paper the variation in the initial letter has not been considered as worthy of differentiation in citing synonymy. However, *Heleocharis* as a name is unjustifiable for several reasons. First, we have no right under the rules to change the original spelling; second, in combining two Greek words into so-called Latin nomenclature, a new language is formed which is not rigorously subject to previous usage; and finally, the name *Heleocharis* tends to be confused with names compounded from "helios" the sun. Into this error Lindley[1] drifted in an unfortunate attempt to correct the name, and others following him have, likewise, erroneously written "*Heliocharis.*"

But little is to be gained by an extended review of the classification of *Eleocharis*. Practically all classifications have been based upon arbitrary characters, and are purely artificial. The author has divided the genus into eleven series which he believes to represent natural groups. Under each series are cited the commoner species belonging to it, so that, provided the specimen in hand has mature fruit, there should be little difficulty in determining the affinities of the plant. Robert Brown, Prod. 224 (1810), set apart *Eleocharis* from *Scirpus* and characterized it as follows:

> *Squamae* undique imbricatae, conformis: vix ullae steriles. *Setae* hypogynae (4–12) denticulatae, rarò nullae. *Stylus* 2–3-fidus, basi dilatatâ cum ovario articulatâ. *Nux* saepiùs lenticularis, basi dilatatâ induratâ styli coronata.

It is, accordingly, to be separated from *Scirpus* on the basis of monocephalic inflorescence without bracts, i. e., "nuda," and an "indurated" style-base which is "dilated" and "articulated" with the ovary. This description applies very well to *E. palustris*, which has generally been taken as typifying the genus, but as in other genera of the *Cyperaceae*, difficulty has arisen in limitation of the description to a natural group. Especially has this been true of the series *Pauciflorae* represented by *E. pauciflora*, *E. parvula*, and *E. rostellata*, the members still being treated by European and some American botanists as either *Scirpus* or *Eleocharis* (*Heleocharis*).

[1] Lindl. Syn. Brit. Fl. 280 (1829) and in succeeding editions. The name is still further complicated by the spelling *Elaeocharis* employed by Ledebour and Schur, arising perhaps from a misconception of the derivation. Also Schultes, Mant. ii. 2 (1824) apparently misread *Heleophila* for *Heleophylax* Lestib. Essai Cyp. 41 (1819) (which seems to refer to *Scirpus validus*, etc.) and substituted the name *Heleogiton* ("character ut in *Heleochari*. Semen nudum") because of the pre-existing *Heliophila*.

However, it seems clear, as it did to Palla[1] on the basis of anatomical investigation, that we are dealing with true *Eleocharis*, for the style-base, though small, is clearly and sharply different in texture from the remainder of the achene (although under insufficient magnification they may appear homogeneous) and is invariably thicker at its junction with the body of the achene than with the base of the style; therefore, it may be interpreted as both "dilated" and "articulated." It is otherwise in the monocephalic *Scirpus Clintonii* and *S. planifolius* of eastern North America, which are related to *Scirpus hudsonianus* (Michx.) Fernald[2] (*Eriophorum alpinum* L.). These have the lowest scale extended as a bract and the soft granular texture of the achene associated with *Scirpus* and *Eriophorum*. Palla's anatomical work undoubtedly paves the way for an understanding of the natural genera under the *Cyperaceae*. However, his separation of *Scirpus* into eight genera:—*Dichostylis* (various species of *Cyperus* and *Fimbristylis*), *Trichophorum*[3] (*S. hudsonianus* Fernald, and allied species), *Scirpus* (*S. cyperinus* and allies), *Holoschoenus* (*S. Holoschoenus*), *Blysmus* (*S. rufus* and *S. Caricis*), *Schoenoplectus* (*S. americanus* and allies), *Heleocharis* and *Isolepis* (*S. carinatus* A. Gray and allies)—increases the already unwieldy number in the *Cyperaceae;* and most of them will probably continue to be treated as sections of *Scirpus*. Palla's treatment has, however, been followed by Schinz & Keller. A great contribution to the knowledge of the *Cyperaceae* has been made by Nees ab Esenbeck,[4] although he split the family into innumerable genera too finely drawn to be accepted at the present time. Several of these genera, i. e., *Chaetocyperus, Limnochloa, Scirpidium, Eleogenus* and *Eleocharis* are now generally included under *Eleocharis*.

In his classic observations on the homology of floral parts in the

[1] Palla, Zur Kenntnis der Gattung "Scirpus," Engler, Bot. Jahrb. x. 299 (1889).

[2] Fernald, Rhodora, viii. 161 (1906); for detailed discussion see Fernald Rhodora, vii. 131, 132 (1905).

[3] *Trichophorum*, as interpreted by Palla, l. c. (1889) and Bot. Zeit. liv. Ab. 1: 146 (1896), consisted of *Eriophorum alpinum* L. (*Scirpus hudsonianus* Fernald), *S. caespitosus* L. and *S. alpinus* Schleich., but did not include *S.* (*Eleocharis*) *pauciflorus* Lightf. as Richter erroneously intimated when he listed *Trichophorum pauciflorum* Palla as a synonym in Plantae Europaeae, 139 (1890). Palla, l. c. states that such a combination had never been made. *Trichophorum* was first separated as a genus by Persoon, Syn. i. 69 (1805), a "genus intermedium inter S c i r p i u m et E r i o p h o r u m," on the basis of the elongated bristles, and comprised *S. alpinus* and *S. cyperinus*.

[4] Especially Nees, Cyperaceae in Wight, Contrib. Bot. Ind. (1834); Linnaea, ix. 273-306 (1834); and in Martius, Fl. Bras. ii. (1842).

Cyperaceae, Nees, Linnaea, ix. 281 (1834) wrote: "the pistil consists normally of three carpels, keeled, valvately united, and grown together inwardly, the angles alternating with the inner stamens. From the ovules of these carpels only one develops. Not rarely a carpel is lacking, most generally the one turned toward the axis. The fruit then becomes lenticular or plano-convex with a more convex outer face. The style is more or less 2–3 parted, and the number of these partitions denotes the form of the fruit, whether triangular or lenticular" [translation mine].

Recent subdivisions of *Eleocharis*[1] have been largely based on the number of style-parts (2 or 3) and on the concomitant flattened or triangular achene. However, series of forms can be demonstrated in wholly different groups showing a transition from triangular to lenticular achenes.[2] This criterion, therefore, cannot in itself be maintained as a basis for the separation of sections or subgenera within *Eleocharis*. However, where such a transitional series exists, it may be inferred that species with triangular achenes are, other things being equal, phylogenetically older than those with plano-convex or lenticular achenes. *E. elongata* (confined to Florida) is the only member of the series *Mutatae* having triangular achenes, and it is also the most distinctly aquatic. Its close relatives, *E. Robbinsii* and *E. plicarhachis*, in their occasionally triangular achenes and the persistently triangular base of the style, show clearly the transition. A similar series may be found in the *Pauciflorae*. Plowman, Ann. Bot. xx. 25 (1906), on the basis of anatomical studies came to the conclusion that "*Eleocharis* is apparently a long-established and much reduced limicolous genus from near the common origin of the order." By him the *Monocotyledon* prototype is hypothetically considered as a large-leaved aquatic which was driven by drouth or flooding "to the dry banks, or carried into humus bogs and salt marshes," thus deriving on the one hand the rhizomatous genus *Carex* and on the other hand the tuberous genus *Cyperus*. At the same time came a reduction of fundamental tissue and changes in the stelar structure, notably the formation of amphivasal bundles.

Bristles and stamens are likewise exceedingly variable throughout the genus. The normal perianth of six bristles—of extreme import-

[1] Cf. C. B. Clarke, Kew Bull. Add. Ser. viii. 105 (1908).

[2] Such a characteristic is not confined to *Eleocharis* but occurs also in *Scirpus* and in the *Polygonaceae* (*Polygonum*).

ance in classification under the artificial Linnean system, even as to the delineation of genera (cf. *Isolepis* R. Br.)—is often reduced, or may be entirely absent.

The number of bristles may be exceedingly constant in some species, and their lack a situation of great rarity, as in *E. capitata* (*E. tenuis*); or the bristles may be commonly either present or absent, as in *E. Engelmanni* and *E. caribaea;* or they may be of a constant reduced size. In all cases the degree of variation is a character confined to the individual species. The bristles are very constant in their texture within a species, and this texture may prove to be one of the most valuable means of identification. In the case of the lenticular achene five bristles are normally found on the outer or abaxial face of the achene—the face which is enveloped by the subtending scale—and the sixth bristle, which belongs to the inner series, is found at the middle of the inner or axial face. The three stamens also occur on the outer face, one of them median, one at each margin of the achene. Where more than six bristles are present, the supernumerary bristles will be found to result from a branching of the bristle on the inner face. This is commonly bifid, resulting in a total of seven bristles, or as in *E. sphacelata*, may be divided into as many as four branches, giving a total of nine bristles. Due to the pressure of time the writer has not had opportunity to study in a detailed way the anatomy of the achene, especially with reference to variation of carpels in the lenticular achene as compared with the triangular achene. Is the lenticular achene induced by crowding in the spikelet, or by the more advantageous position taken up by the stamens toward the periphery of the spikelet?

Two monographs dealing with the North American species of *Eleocharis* have appeared; the first of these by Torrey[1] and the more recent by Britton.[2] The volumes by Roemer & Schultes (1817), Kunth (1837) and Steudel (1855) are mainly compilations, and the work of Boeckeler is to a large extent merely a description of plants without critical comparison between the species. C. B. Clarke's monograph of the *Cyperaceae* has never been published but his classification of species[3] and illustrations[4] were issued after his death.

The bibliography has been assembled (at the end of this paper)

[1] Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 296–316 (1836).
[2] Britt. Journ. N. Y. Micr. Soc. v. no. 4: 95–111 (1889).
[3] Clarke, Kew Bull. Add. Ser. viii. (1908).
[4] Clarke, Illustr. Cyperac. London. (1909).

from three points of view: (1) a citation of recent literature dealing with *Eleocharis;* (2) a citation of a few fundamental systematic treatments; (3) the assembling of scattered publications of C. B. Clarke dealing with *Eleocharis.*

In the problem of dealing with entities below the specific rank it is the policy to treat as *varieties* those which show a definite geographic segregation; and as *forms* those without geographical segregation.

The following abbreviations for herbaria are used:

Canadian National Museum—(C.)
United States National Museum—(U.S.)
New England Botanical Club—(N.E.B.C.)
New York Botanic Garden—(N.Y.)
Pomona College—(P.)
Philadelphia Academy of Sciences—(Ph.)
Botanical Museum, Stockholm—(S.)
Gray Herbarium—(G.)

Unless otherwise noted, specimens are in the Gray Herbarium.[1]

ELEOCHARIS

Preliminary Conspectus of the Genus

Series 1. Mutatae *Limnochloa* Nees in Wight, Contr. Bot. Ind. 71 (1834) and Linnaea, ix. 294 (1834), not Læstib. Essai Cyp. 41 (1819) nor Reichb. Fl. Germ. Excurs. i. 78 (1830). *Eleocharis* § *Limnochloa* Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 296 (1836). *Eleocharis* Subgen. *Limnochloa* C. B. Clarke, Kew Bull. Add. Ser. viii. 105 (1908). Mostly coarse plants with swollen culms which are often as thick as the spikelets. Scales not keeled or only obscurely so, usually indurated, yellow, sometimes with a purple margin. Achenes lenticular (triangular only in some slender New World species), the bristles usually coarse. Style elongated, flat, 2-fid or 3-fid. *E. interstincta, E. dulcis* (*plantaginea*), *E. mutata, E. fistulosa, E. Robbinsii, E. cellulosa,* etc.

Series 2. Pauciflorae. *Scirpus* C. B. Clarke, Kew Bull. Add. Ser. viii. 111 (1908) in part. Style-base confluent with the apex of the achene (in some Andean species forming a ridge at the

[1] This paper on *Eleocharis* follows directly upon the work by Professor M. L. Fernald and Miss A. E. Brackett, The Representatives of Eleocharis palustris in North America, Rhodora xxxi. 57–77 (1929) and Contributions from the Gray Herbarium, no. lxxxiii. It has, therefore, seemed unnecessary to repeat the treatment of the North American species considered by them.

I have just received, from Professor Chermezon, too late to be incorporated in the present paper, a number of specimens of *Eleocharis* from Madagascar. These I hope to include in a succeeding paper. There has also just come to me the excellent and well-illustrated paper on *Eleocharis* by Barros, dealing in great detail with the genus in Argentina. This I must also leave for future consideration.

junction of the style-base and the body of the achene). Achenes greenish or tawny, trigonous, usually reticulate under high magnification. Style 3-fid. *E. pauciflora, E. parvula* (*Scirpus nanus*), *E. rostellata, E. albibracteata, E. Brehmeriana*, etc.

Series 3. Aciculares. *Eleocharis* Subgen. *Eu-eleocharis* Sec. *Aciculares* C. B. Clarke, l. c. 105. Achenes obscurely trigonous or terete, elongated, with longitudinal ridges separated by numerous trabeculae. Lowest scale fertile. Style 3-fid. *E. acicularis, E. cancellata, E. Wolfii, E. bonariensis*, etc.

Series 4. Ovatae. *Eleocharis* Subgen. *Eleogenus* b. *Capitatae* C. B. Clarke l. c. 105, in part. Style-base compressed, lamelliform; achenes biconvex, glistening-brown when mature, under magnification smooth. Style 2-fid. Cespitose annuals. *E. ovata, E. obtusa, E. Engelmanni, E. diandra, E. lanceolata.*

Series 5. Maculosae. *Eleocharis* Subgen. *Eleogenus* C. B. Clarke l. c. 105, in part. Style-base conical or depressed, not lamelliform. Achenes biconvex, black to reddish-brown or olive, the surface smooth or minutely wrinkled under magnification. Style 2-fid.

Sub-series: Ocreatae. Perennial; stoloniferous. Sheaths scarious at the apex. Achenes black to reddish-brown or olivaceous; pericarp marcescent, often slightly wrinkled under magnification. *E. flaccida, E. olivacea, E. maculosa, E. Sellowiana, E. debilis*, etc.

Sub-series: Rigidae. Annual; without stolons. Sheaths firm at apex. Achenes black or purplish; pericarp not marcescent. *E. atropurpurea, E. caribaea, E. praticola*, etc.

Series 6. Palustriformes. Style-base spongy, beak-like, rarely depressed. Achenes bright-yellow to tawny or olivaceous, biconvex or trigonous, smooth to alveolate. Plants usually stoloniferous, with strict, elongated, sometimes spongy culms.

Sub-series: Palustres. *Eleocharis* Subgen. *Eleogenus* c. *Palustres* C. B. Clarke, l. c. 105. Style 2-fid. Upper sheaths oblique at the summit. Achenes lenticular (biconvex), yellow or brown, smooth under magnification. *E. palustris, E. uniglumis, E. mamillata*, etc.

Sub-series: Truncatae. *Eleocharis* Subgen. *Eu-eleocharis* Sect. *Leiocarpeae* c. *Montanae* C. B. Clarke l. c. 106, in part. Styles 3-fid. Upper sheaths truncate, indurated, with a small apiculate projection. Achenes trigonous (in *E. nodulosa* and *E. geniculata* almost or quite lenticular); the surface under magnification alveolate, reticulate or smooth. (In *E. nodulosa* the style is frequently 2-fid.)

Culms not septate, *E. montana, E. capitata* (*E. tenuis*), *E. compressa, E. nitida, E. arenicola, E. tricostata, E. densa, E. Bolanderi*, etc.

Culms septate: *E. nodulosa, E. geniculata.*

Note: To this series also belongs *E. fallax* Weatherby.

Series 7. INTERMEDIAE. Style-base elongated, beak-like; style 2-fid or 3-fid. Achenes elongated, olivaceous, lenticular or obscurely 3-angled; under magnification striate or minutely reticulate. Cespitose plants with weak culms and acuminate spikelets. *E. intermedia, E. Macounii, E. carniolica, E. afflata, E. Widgrenii,* etc.

Series 8. TENUISSIMAE. Plants for the most part dwarf, tufted, and with capillary culms. Achenes small (0.4–1 mm. long), sharply or obscurely trigonous (in *E. savannarum* almost lenticular). Spikelets often distichous. Achenes present at the culm-bases in many species. Style 3-fid.

Sub-series: CHAETARIAE. *Eleocharis* Subgen. *Eu-eleocharis* Sect. *Chaetarieae* C. B. Clarke, l. c. 106, in part. Achenes coarsely reticulate, *i. e.* cancellate. *E. retroflexa, E. arenaria, E. savannarum,* etc.

Sub-series: LEIOCARPEAE. *Eleocharis* Subgen. *Eu-eleocharis* Sect. *Leiocarpeae* C. B. Clarke, l. c. 106, in part. Achenes smooth or very finely reticulate under magnification.

Spikelets not distichous or only obscurely so. *E. microcarpa, E. nana, E. Torreyana, E. nigrescens,* etc.

Spikelets clearly distichous: *E. Baldwinii, E. oligantha, E. minima, E. urceolata.*

Series 9. SULCATAE. *Eleocharis* Subgen. *Eu-eleocharis* Sect. *Leiocarpeae* b. *Sulcatae* C. B. Clarke, l. c. 106, in part. Achenes white, sharply or obscurely trigonous, usually exceeding 1 mm. in length. Culms usually strict and coarser than in the preceding section. Style 3-fid. *E. sulcata, E. pachystyla, E. pachycarpa, E. albida, E. bermudiana,* etc.

Series 10. MELANOCARPEAE. Achenes black, smooth, sharply trigonous. *E. melanocarpa.*

Series 11. TUBERCULOSAE. *Eleocharis* Subgen. *Eu-eleocharis* Sect. *Chaetarieae* C. B. Clarke, l. c. 106, in part. Achenes obscurely trigonous; style-base enlarged and mitriform, sometimes equalling the body of the achene in size. The American species with achenes deeply cancellate. *E. tuberculosa, E. simplex, E. tetraquetra, E. Wichurai.*

Series MUTATAE

(Plate 188)

a. Culms septate. . . . *b.*
  b. Surface of achene reticulate, often with conspicuous longitidinal ridges. . . . *c.*
    c. Surface of the orbicular achene with inconspicuous hexagonal or square cells. . . . *d.*
      d. Spikelets 4–5 mm. in diameter; scales gray; bristles 6–7 . . . . . 13. *E. dulcis.*
      d. Spikelets 5–8 mm. in diameter; scales light-brown; bristles 7–9. . . . . 14. *E. sphacelata.*

c. Surface of achene with transverse linear cells....*e.*
e. Septa approximate below the spikelet; bristles coarse, exceeding the achene.....1. *E. interstincta.*
e. Septa not approximate; bristles poorly developed; achene nearly smooth.....2. *E. equisetoides.*
b. Surface of the elliptic achene merely punctulate; culms slender 15. *E. equisetina.*

a. Culms not septate....*f.*
f. Culms angled; bristles toothed....*g.*
g. Culms coarse (2–5 mm. in diameter)....*h.*
h. Culms 4-angled; achene constricted below the summit into a neck about ¼ the width of the achene.....3. *E. quadrangulata.*
h. Culms 3-angled....*i.*
i. Achene constricted below the summit into a neck about ½ the width of the achene.....7. *E. fistulosa.*
i. Achene not constricted, but gradually prolonged into a cellular beak....*j.*
j. Achene dark-brown, with obscure narrowly linear cells 5. *E. spiralis.*
j. Achene yellowish, with conspicuous quadrangular cells 4. *E. mutata.*
g. Culms slender (1–2 mm. in diameter)....*k.*
k. Achene 1 mm. long, trigonous; culms often floating...9. *E. elongata.*
k. Achene exceeding 1.5 mm. in length, lenticular (rarely trigonous in *E. Robbinsii* and *E. plicarhachis*)....*l.*
l. Surfaces of achene with deep-pitted hexagonal cells; spikelets elongate, with spreading scales..10. *E. philippinensis.*
l. Surfaces of achene with transverse quadrangular cells...*m.*
m. Achene elongate (about 4 mm. in length); spikelet appearing like a continuation of the sharply triangular culm.....8. *E. Robbinsii.*
m. Achene orbicular, 2–3 mm. long; spikelet contrasting with the obscurely triangular or terete culm....*n.*
n. Culms dull, rigid; faces of achene with 20–25 rows of linear-quadrangular cells; base of style ½–¾ the width of the achene..11. *E. variegata* var. *laxiflora.*
n. Culms shiny, soft; faces of achene with 12–15 rows of quadrangular cells; base of style ⅓ the width of the achene.....12. *E. plicarhachis.*
f. Culms terete; achene prolonged into a cellular beak; bristles without teeth.....6. *E. cellulosa.*

1. E. INTERSTINCTA (Vahl) R. & S. FIG. 2. Culms terete, 4–10 dm. high, about 5 mm. thick, septate; the septations becoming approximate below the spikelet: caudex short; roots coarse, light-brown or reddish-brown: sheaths membranous, pointed at the summit; the basal sheaths sometimes free and elongated: style 2- or 3-fid: stamens 3: spikelets cylindric, 1.5–4 cm. long, many-flowered: scales in several ranks, oblong, often acute, striate, straw-colored or grayish, with a scarious margin: achenes rough, 2 mm. long (excluding the style-base), yellow or gray, with prominent transverse rectangular cells often forming longitudinal ribs, and a pronounced annular thickening at the summit: style-base dark-brown: bristles 6, exceeding the achene, stout, flattened, with coarse teeth.—Syst. ii. 149 (1817); Britton, Journ. N. Y. Micr. Soc. v. 97 (1889) excl. *E. equisetoides*

and syn. in part; C. B. Clarke in Urb. Symb. Ant. ii. 60 (1900) in part, Ill. Cyp. t. 33, figs. 6–9 (1909). *Scirpus plantagineus* Swartz, Fl. Ind. Occ. i. 123 (1797), excl. syn.; and of many later auth., not of Retz. *S. interstinctus* Vahl, Enum. ii. 251 (1805). *Limnochloa articulata* Lindl. & Nees in Mart. Fl. Bras. ii.[1] 100 (1842).[1] *E. articulata* Kunth, En. ii. 157 (1837). *E. septata* Miq. Linnaea, xvii. 58 (1843). *E. articulata* Steud. Cyp. 81 (1855). *E. plantaginea* Boeckl. Linnaea, xxxvi. 474 (1869–1870) and Cyp. Nov. ii. 14 (1890), as applied to the American plant. *S. polygamus* Wright mss. ex Boeckl. Flora, lxiv. 78 (1881).—In shallow water, Texas, Bermuda Islands, West Indies, and northern and central South America. TEXAS: (W. Tex. to El Paso) *C. Wright* 707; Del Rio, *Neally* 112 (N.Y.). BERMUDA: *Robinson* 102; *Moore* 3010; *Collins* 169; *Harshberger* in 1905. CUBA: *C. Wright* 710, 3768 (as *S. polygamus*); *Combs* 431; Prov. Santiago, *Pollard & Palmer* 305; Isle of Pines, *Curtiss* 498. GRENADA: *Broadway* in 1905. JAMAICA: *Alexander* in 1850 (in part). HAITI: *Leonard* 3538. COLOMBIA: Santa Marta, *H. H. Smith* 245; San Antonio, *Langlassé* 34. BRITISH GIUANA: Georgetown, *Hitchcock* 16652. DUTCH GUIANA: *Hostmann* 661; *Samuels* 508. BRAZIL: *Burchell* 4159, 2650; Para, *Goeldi* 1039. BOLIVIA: Lake Rogagua, *Rusby* 1422.

Vahl first described this plant (as *Scirpus*) from Martfeld's West Indian collection, and characterized it as similar to *Scirpus geniculatus* but with "*isthmi superne approximati, nec remotissimi,*" a character which also separates it from the more northern *Eleocharis equisetoides*. In addition, the achene of *E. interstincta* is coarser than in *E. equisetoides*, with deeper pittings and stronger bristles. The Wright plant labeled *S. polygamus* (3768) in the Gray Herbarium is rather immature, with thin culm and elongated spikelets, but is unquestionably *E. interstincta*.[2] The figure in Britton & Brown Ill. Fl. is of *E. equisetoides*.

2. E. EQUISETOIDES (Ell.) Torr. FIG. 1. Culms terete, 5–10 dm. high, about 5 mm. thick, prominently septate at intervals of 1–5 cm.; the surface roughened by numerous minute projections: caudex short; roots coarse, reddish brown: sheaths membranous, pointed at the summit; those at the base often free from the culm and greatly elongated: style 2- or 3-fid: stamens 3: spikelets cylindric, 2–4 cm. long, many-flowered: scales in several ranks, oblong, striate, straw-colored, with an obscure purplish border beneath the scarious margin:

[1] *Eleocharis articulata* Kunth, Enum. ii. 157 (1837) was wrongly ascribed to Nees by Kunth (Flora, ix. 294 (1835) where Nees used the name *Limnochloa articulata* as a *nomen nudum*. The first valid publication of this synonym is in Martius, Flora Brasiliensis, as quoted above.

[2] Boeckeler, Flora, lxiv. 78 (1881) says that this plant is *E. plantaginea* R. Br., forma americana.

achenes nearly smooth, 2–2.5 cm. long (including the style-base), golden-yellow or light-brown, broadly obovate, biconvex, with fine transverse linear-rectangular reticulations: style-base dark-brown: bristles narrow and weak, rarely equalling the achene.—Ann. Lyc. N. Y. iii. 296 (1836). *Scirpus geniculatus* Pursh, Fl. Am. Sept. i. 55 (1814), not L. *S. equisetoides* Ell. Sk. S. Car. i. 79 (1816). *S. obtusus* Willd. in Spreng. Syst. i. 204 (1825), in part. *E. Elliotti* A. Dietr. Sp. Pl. ii. 82 (1833). *E. interstincta* Britton, Journ. N. Y. Micr. Soc. v. 97 (1889), in part; Britton & Brown Ill. Fl. i. 248 (1896), as to fig. not (Vahl) R. & S.—Shallow water, Massachusetts to Florida and Texas, chiefly on the coastal plain, and locally inland to Michigan and Wisconsin. MASSACHUSETTS: Lake Waban, Wellesley, *Morong* in 1883; *Fernald & Wiegand*, Pl. Exs. Gray. 132. RHODE ISLAND: Cumberland, *Olney;* Tippecan Pond, West Greenwich, *Graves & Woodward* in 1920. CONNECTICUT: Long Pond, Thompson, *Weatherby* 4370. NEW YORK: Sag Harbor, L. I., *Cathan & Ferguson* 5829. NEW JERSEY: pond south of Repaupo, *Van Pelt* in 1907. MARYLAND: Salisbury, *Canby* in 1865. SOUTH CAROLINA: Santee Canal, *Ravenel.* GEORGIA: Sumter Co., *Harper* in 1897; Lee Co., between Rift and Chokee, *Harper* 1071. FLORIDA: Eustis, *Nash* 1322. MICHIGAN: Jackson Co., *J. Wright* in 1838; Pleasant Lake, *Hicks* in 1893. ILLINOIS: Chicago (Wolf Lake), *Hill* in 1890 (mixed with *E. quadrangulata*). TEXAS: *C. Wright.* LOUISIANA: *Buckley* in herb. Short (Ph.).

This species can be readily distinguished from *E. interstincta* by the remote articulations below the spikelet and by the roughened character of the culms. The smooth achene is decidedly different. Pursh described *Scirpus geniculatus* from "the sea-shore of Virginia and Carolina"; but, although the Pursh specimens have disappeared, there can be no question as to the identity, for *E. geniculata* is confined to the tropics. The species (*E. equisetoides*) was described by Elliott from specimens collected by Schweinitz near Fayetteville, North Carolina, but was merged with the tropical *E. interstincta* by Clarke.

3. E. QUADRANGULATA (Michx.) R. & S. FIG. 4. Culms 4-sided, with sharp angles, coarse, 5–10 dm. high, from a short caudex: roots coarse, gray, often tuber-bearing: sheaths red or brown, membranous, with a loose brown tip, glistening, sometimes prolonged into leaf-like blades: spikelets 2–5 cm. long, cylindric, acute: scales 4-ranked, elliptic, 5 mm. long, 2 mm. wide, rounded or somewhat acute, straw-colored, striate, not keeled: style 2- or 3-fid: stamens 3: achene 2.7–4.2 mm. long including the beak (1 mm. long), narrowly obovate, deep shining-brown, almost smooth, with about 24 rows of transverse linear cells, narowed at the summit to a neck about one-fourth the width of the achene, broadening again to form the base of

the elongated triangular style: bristles light-brown, equalling the achene, slender and obscurely toothed.—Syst. ii. 155 (1817); Torr. Ann. Lyc. N. Y. iii. 297 (1836); Boeckl. Linnaea, xxxvi. 472 (1869–1870); Fernald, RHODORA, xxvii. 38, t. 149, figs. 1–4 (1905). *Scirpus quadrangulatus* Michx. Fl. Bor.-Am. i. 30 (1803); Elliott, Sk. S. Car. i. 78, t. 3, fig. 2 (1816). *S. marginatus* Muhl. Gram. 28 (1817). *S. albomarginatus* R. & S. Mant. ii. 74 (1824). *E. mutata* Britton & Brown, Ill. Fl. ed. 2, i. 311, fig. 759 (1913), not *S. mutatus* L.—In ponds, often on peaty shores, Massachusetts to southern Ontario, south to Georgia, Louisiana and Texas, chiefly on the coastal plain. MASSACHUSETTS: Lake Waban, Wellesley, *Fernald & Wiegand*, Pl. Exs. Gray. 133. CONNECTICUT: West Pond, North Guilford, *Bartlett* 782. NEW YORK: Duck Lake, Conquest, *Wiegand, Eames & Randolph* 11410; Oneida Lake, *Curtiss* in 1866; Oswego Co., Paddy Lake, South Scriba, *W. W. Rowlee* in 1906. NEW JERSEY: Cape May, *Van Pelt* in 1906; Johnson's Pond, Dennisville, *C. F. Parker* in 1866; Swartswood Pond, Sussex Co., *Porter* in 1878. PENNSYLVANIA: Presque Isle, *Porter* in 1868. DELAWARE: *Canby;* Townsend, *Commons* in 1868. DISTRICT OF COLUMBIA: near Washington, *L. F. Ward* in 1884. VIRGINIA: Princess Anne Co., Salt Pond, *Randolph* 470; Cape Henry, *Randolph* 334; Chickahominy River, Wilcox Neck, *Grimes* 4125; Franklin, Southampton Co., *Heller* 1149. SOUTH CAROLINA: Santee Canal, *Ravenel.* GEORGIA: Chatham Co., near Savannah, *Harper* 1835. ONTARIO: Lambton Co., Sarnia Bay, *C. K. Dodge* in 1894. MICHIGAN: Ingham Co., Pine Lake *Thurber* in 1860. OHIO: Portage Co., E. Twin Lake, *Webb* in 1915. ILLINOIS: Chicago (Wolf Lake), *E. J. Hill* 90 in 1890 (in part). MISSOURI: Newton Co., *Bush* 370; St. Louis, *Drummond.* OKLAHOMA: Mill Pond, Sapulpa, *Bush* 631. LOUISIANA: *Carpenter.* TEXAS: Hempstead, *E. Hall* 695; E. Texas, *C. Wright.*

Originally described by Michaux from Carolina; but Muhlenberg independently described it (1817) as *S. marginatus*, a name antedated by *S. marginatus* Thunberg, Prod. Fl. Cap. 17 (1794) and therefore changed by Roemer and Schultes (1824) to *S. albomarginatus.* Britton has considered *E. quadrangulata* as only a form of *E. mutata* (L.) R. & S., but Fernald[1] has shown that it is quite distinct from *E. mutata*, in the constricted base of the tubercle and the consistently 4-angled culm. Torrey (l. c.) observed also the strong resemblance to *Scirpus acutangulus* Roxb.

4. E. MUTATA (L.) R. & S. FIG. 8. Culms sharply triangular,

[1] Fernald, M. L. The Validity of Eleocharis quadrangulata, RHODORA xxvii. 37–40, t. 149 (1925). Three species of America have recently been passing under the name *E. mutata:* namely *E. quadrangulata, E. mutata,* and *E. fistulosa. E. fistulosa* differs from *E. quadrangulata* in the 3-angled culm and smaller achenes with characteristic markings.

coarse, 4–10 dm. high, from a short caudex; roots very numerous, fibrous gray or brown: sheaths straw-colored or light brown, membranous, pointed at the summit, often elongated: spikelets 1.5–5 cm. long, cylindric, usually obtuse: scales many-ranked, straw-colored, thin, orbicular to obovate, with broad membranous sides, and an erose upper margin, often slightly keeled: style 3-fid: stamens 3: achene 1.7–2.3 mm. long (including the style-base), elliptical or obovate, shining, rather smooth, yellow to brown, with about 24 rows of shallow, transversely linear cells with their margins often slightly raised, surmounted at the summit by an annular thickening which merges gradually into the short style-base: bristles 6, irregular, equalling the achene, lustrous-brown, with coarse but soft teeth.—Syst. ii. 155 (1817); Kunth, Enum. ii. 154 (1837); C. B. Clarke in Urb. Symb. Ant. ii. 61 (1900), excl. syn.; Britton & Brown, Ill. Fl. ed. 2, i. 311 (1913), in part; Fernald, Rhodora, xxvii. 39, t. 149, figs. 11–14 (1925). *Scirpus mutatus* L. Amoen. Acad. v. 391 (1759); Sp. Pl. ed. 2, i. 71 (1762); Vahl. Enum. ii. 252 (1805); Griseb. Fl. Brit. W. I. 571 (1864). *Limnochloa mutata* Nees, Linnaea, ix. 294 (1835). *E. scariosa* Steud. Cyp. 80 (1855). *E. spiralis* Boeckl. Linnaea, xxxvi. 473 (1869–1870), as to American plant.—West Indies, Central America, and northern South America. Jamaica: *Harris* 12310. Porto Rico: *Sintenis.* 4942 (*H. spiralis* det. Boeckl.). St. Croix: *Ricksecker* 210. St. Jan: *Eggers* in 1877. Virgin Islands: *Fishlock* 316. Grenada: *Broadway* 1794. Panama: Canal Zone, *Pittier* 6775. Venezuela: vic. Maracaibo, *Pittier* 10685; El Limon near Maracay, *Pittier* 10116; vic. Cristobal Colon, *Broadway* 580. Colombia: Dept. El Valle, Buenaventura, *Killip* 11744. Galapagos Islands: Albemarle Is., *Snodgrass & Heller* 261;[1] *Stewart* 1081. Guadeloupe: *Duss* 3441. British Guiana: Pomeroon District, *De La Cruz* 941. French Guiana: *Broadway* 203. Brazil: *Martius* 229.[2] Paraguay: Cerros de Tobaty, *Hassler* 6414. (Guatemala: *Tuerckheim* 1283. The specimen is very young. It may belong with this species.)

The plant was originally described from Jamaica by Elmgren, a student of Linnaeus. It differs from *E. quadrangulata* in characters previously mentioned under that species, and also in the orbicular scales. It seems most closely related to *E. spiralis* of the Old World, to which it was referred by Boeckeler. The scales of *E. spiralis* are firmer, more sharply truncate, and the spikelets shorter and thicker

[1] Fernald Rhodora, xxvii. 39, and t. 149, fig. 11 (1925) considers this specimen as not characteristic, since the apex of the achene is somewhat constricted, and that it might be worthy of separation when more collections were available. The material is rather fragmentary. The achenes are smaller than the average but have the cellular structure and the same type of bristle as in typical *E. mutata*. The other collection (*Stewart* 1081) from Albemarle Island is typical *E. mutata*.

[2] *E. scariosa* Steud. was based on Nees 229, deriving its name from the scarious development of the lowest sheaths, which, however, is a common occurrence in the group to which *E. mutata* belongs.

than in *E. mutata*. The shiny achenes resemble those of *E. mutata* but are smoother, with finer markings and a deep chocolate-brown color. The bristles of the Borneo plant[1] are more slender and have irregularly scattered teeth.

In the spongy texture of the achene and the character of the beak, *E. mutata*, *E. spiralis* and *E. cellulosa* seem to form a group of closely related species. C. B. Clarke (Urb. Symb. Ant. ii. 61 (1900)) considered *E. mutata* a species quite different from *E. spiralis* R. Br., which grows in southeastern Asia, and perhaps best joined specifically with *E. fistulosa* Schultes, a species growing in both the Old and the New Worlds.

5. E. SPIRALIS (Rottb.) R. & S. FIG. 12. Culms sharply triangular, 4–8 dm. high, 2–3 mm. wide: spikelets cylindric, 1.5–2.5 cm. long, 5–6 mm. wide, obtuse: scales cuneate, 3 mm. long, light-brown, striate, firm; the truncate upper edge with a hyaline margin: style 3-fid: stamens 3: achene elliptic, 2–2.4 mm. long (including the beak), shining, dark-brown, lenticular, with about 20 rows of transverse linear-quadrangular cells, with light-brown beak: bristles 6, brown, equalling the body of the achene, with both antrorse and retrorse teeth.—Syst. ii. 155 (1817); Boeckl. Linnaea, xxxvi. 473 (1869–1870), in part; Benth. & Muell. Fl. Austr. vii. 292 (1878), in part; C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 627 (1893), in Durand & Schinz, Consp. Fl. Afr. v. 601 (1895), and Ill. Cyp. t. xxxv. figs. 5–7 (1908). *Scirpus spiralis* Rottb. Desc. et Ic. 45, t. xv. fig. 1 (1773); Roxb. Fl. Ind. (ed. Wall.) 215 (1820). *Limnochloa spiralis* Nees in Wight, Contrib. Bot. Ind. 114 (1834).—According to C. B. Clarke, the species occurs in southern India, Ceylon and Mauritius. BRITISH NORTH BORNEO: Jesselton, *Clemens* 9716 (distributed as *E. variegata*), is the only specimen of the species in the Gray Herbarium.

Very closely related to *E. cellulosa* and *E. mutata*[2] of the New World, which it resembles in the peculiar glassy surface of the achene, stout beak and short scales; but *E. spiralis* differs from *E. cellulosa* in the elongated linear cells of the achene, the less spongy beak, toothed bristles and truncate scales, and in the thicker spikelet. The description is largely based upon *Clemens* 9716 which lacks rootstocks. First described by Rottböll from specimens sent to him by Koenig from Malabaria (India), the name being derived from the spiral arrangement of the scales.

[1] There is no authentic material of *E. spiralis* in the Gray Herbarium, but *Clemens* 9716, from Borneo (distributed as *E. variegata*), agrees with Clarke's illustration of *E. spiralis* (C. B. Clarke, Ill. Cyp. t. xxxv. figs. 5–7 (1909)) and with descriptions.

[2] See discussion under *E. mutata*.

(*To be continued.*)

COPTIS TRIFOLIA AND ITS EASTERN AMERICAN REPRESENTATIVE

M. L. Fernald

The little evergreen herb known as *Coptis trifolia* (L.) Salisb. has been reputed to occur in three quite separate areas of the northern hemisphere: (1) southern Greenland and Labrador to Manitoba, south to New Jersey, Pennsylvania, the mountains of North Carolina and Tennessee, northern Ohio, northern Illinois and northern Iowa; (2) Alaska and adjacent northern British Columbia westward across eastern Siberia and south to Japan and Manchuria; (3) Iceland, Norway and central Russia. Such a completely disrupted range indicates long isolation of the three reputed areas. It has, consequently, seemed worth while to study *Coptis trifolia* with some care, to see if it has remained essentially constant throughout its whole range.

The first embarrassment arises from the fact that, although in the Gray Herbarium there is very abundant material from northeastern America and Greenland and a satisfactory series from Alaska and northeastern Asia, there is absolutely nothing to show for the plant from Europe. It has, accordingly, been necessary to investigate the bases of its European records. The report of *Coptis trifolia* from Iceland seems to have started in 1774 when Murray in L. Syst. ed. 13, emend. Murr. 432 (1774) appended to the description of *Helleborus trifolius* L. and a citation of Oeder's plate in Flora Danica of the Greenland plant the note "*Etiam in Islandia.*" Later students of the Iceland flora have repudiated this record. For instance, Hornemann, Fl. Dan. ix. fasc. xxvi. 3, t. mdxix (1816), referred to the plant as growing in Danish territory only in Greenland; Lange, in 1887, in his Nomenclator "Florae Danicae" (covering all Scandinavia as well as Iceland and Greenland) enumerated it (p. 165) only from Greenland; and it is not even mentioned in the detailed Icelandic floras of Hjaltalín (1830), Grønlund (1881) and Stefánsson (1901).

The records from Norway are, likewise, very unsatisfactory. In 1817, DeCandolle, describing *Coptis trifolia*, gave the range: "in . . . regionum Borealium, nempè in Islandiâ (Oed.), Norwegià (Gun.), Groenlandiâ, *Horn.* Sibiriâ," etc.[1] In the place cited

[1] DC. Syst. i. 322 (1817).

by DeCandolle, however, Fl. Dan. iv. fasc. x. 5, t. dlxvi. (1770), Oeder made no mention of Iceland, saying clearly "Locus. In Groènlandia"; and in Gunnerus, Flora Norvegica, pt. 2: 139, no. mlxvi. cited by DeCandolle as the basis for the plant in Norway, we find: "Norv. *Nordsimmer.* In grönlandia." "*Nordsimmer,*" which DeCandolle apparently mistook for a locality in Norway, was, of course, the Norwegian name assigned by Gunnerus to the plant, just as in the two species immediately following it (and in all others) Norwegian names were given by Gunnerus: *Ledum groenlandicum,* "Norv. *Grönlandsk Thé.* Anglorum *Labrador-thé* . . . Habitat in grönlandia"; and *Scilla bifolia,* "Norv. *Faeröisk Hyacinth.* In insulis faeröensibus." In 1893 another record of *Coptis trifolia* from Norway was published by Dr. Ernst Huth: "E u r o p a: Islandia (ex LINNÉ [meaning Murray] syst. ed. XIII sed dubia aliis testibus), Norvegia (H I V!), Rossia media (teste LEDEBOUR)."[1] The reference "Norvegia (H I V!)" was to a specimen in the Imperial Herbarium at Vienna; but in view of the facts, that *Coptis* is not admitted as a Scandinavian plant by such thorough students of the Scandinavian flora as Blytt, Fries, Hartman, Lindman and Norman, and that the Norwegian record by Huth was wholly ignored by Gürke in his Plantae Europaeae, ii. 419 (1903), it is a fair assumption that Huth's record involves some error. That the earlier Norwegian record of DeCandolle was based on error has been made clear.

Huth's basis for *Coptis* in Russia was Ledebour, Flora Rossica, i. 53 (1841); and Ledebour's statement, though detailed, was wholly based on records in literature by Pallas and by Lepechin: "Hab. in R o s s i a m e d i a [pr. Sarapul Gub. Wiätka (PALL.), Kasan (LEPECH.)], in part. bor. jugi Ural (PALL.)." These localities are definite and the early records were circumstantial, as, for instance, when Pallas, writing in 1773 of his travels in Wiätka, said "Ich kam den 7ten April nach Sarapul zurück. Der Schnee war schon in freyen Gegenden ganz verschwunden und man sahe den Huflattich und am 9ten April unter den Gebüschen den häufigen *Helleborus trifolius* mit Blumen hervor kommen";[2] or again when, in describing the arctic and subarctic region, Samojeden, between the northern Ural and the mouth of the Ob, Pallas enumerated the plants: "Ich muss beym Beschluss diese Reise ein Verzeichniss der Pflanzen,

[1] E. Huth, Engler's Bot. Jahrb. xvi. 302 (1893).
[2] Pallas, Reise, iii. 485, 486 (1776).

welche in den arktischen Wüsteneyen gesammlet worden sind, . . . *Salix myrtilloides, herbacea, lapponica,* . . . *Arbutus alpina* [*Arctostaphylos alpina*] und *Empetrum nigrum,* . . . *Saxifraga cernua, rivularis, bronchialis* und *nivalis; Dryas octopetala,* . . . *Veronica alpina;* . . . *Andromeda hypnoides* [*Cassiope*]; . . . *Rubus arcticus, Helleborus trifolius;*" etc.[1] The most significant feature of the reports of *Coptis trifolia* in European Russia and western Siberia is the fact that Ledebour, two-thirds of a century after Pallas and Lepechin, could find no other evidence than their statements for the plant so far west in Eurasia; and that Huth, monographing the group more than a half-century later, should still rely solely on the unsupported statements of Pallas and of Lepechin. As to the occurrence of *Coptis trifolia* in the arctic flora of Samojeden, it may be noted that *Ranunculus lapponicus* L. superficially strongly simulates *Coptis trifolia* and is particularly similar to the crude illustration of the latter plant published by Linnaeus in 1751, the only illustration available to Pallas and to Lepechin; and *R. lapponicus* is well known from the Samajeden region, although Pallas did not list it. Ledebour, Fl. Ross. i. 36 (1841), cited *Ranunculus lapponicus* as growing in "terrae Samojedarum regione sylvatica et subarctica (SCHRENK *in litt.*)" and an excellent sheet of Schrenk's collection is before me. Ruprecht, Flores Samojedorum Cisuralensium, 18 (1846), enumerated *R. lapponicus* but not *Coptis trifolia;* and, similarly, Sommier, in his Flora dell 'Ob Inferiore, 58 (1896), listed *R. lapponicus* "In sphagnosis humidis tundrae et sylvarum haud frequens," but did not mention *Coptis.* Incidentally, the date, April 9th, when Pallas reported finding *Helleborus trifolius* flowering, would be amazingly early for the plant of northeastern Asia and Alaska. The flowering specimens of the latter in the Gray Herbarium were all collected in May, June and July, and at the extreme southern limit of the species, in Japan, it is said to flower in June and July.[2] It seems most reasonable, therefore, to infer that the old records of Pallas and of Lepechin, of *Coptis trifolia* as a Russian plant were based on misidentifications. This conclusion has been independently reached by Hultén who says: "The plant was reported from Europe (Iceland, Norway, central Russia) by LEDEBOUR and HUTH and after them by other authors. These reports must certainly be

[1] Pallas, l. c. 33, 34 (1776).
[2] Miyoshi & Makino, Pocket-Atl. Alp. Pl. Jap. ed. 2, i. 13 (1907).

regarded as erroneous and are probably due to confusion of synonyms and labels.[1]

When the plants of the two veritable areas, of Atlantic North America and Greenland (*Anemone groenlandica* Oeder) and of northeastern Asia and Alaska (true *Coptis trifolia*) are compared, several important distinctions at once appear. Superficially, to be sure, the two are so similar as to have passed unchallenged as one species, but in technical characters the flowers and fruits are quite distinct. The contrasts between the two may best be displayed in tabular form.

COPTIS TRIFOLIA (L.) Salisb. (THE PLANT OF NORTHEASTERN ASIA AND ALASKA)	ANEMONE GROENLANDICA Oeder (THE PLANT OF NORTHEASTERN AMERICA AND GREENLAND)
Petioles of the larger leaves 2–15 cm. long, 1/5–1/2 the length of the middle leaflet.	Petioles of the larger leaves 1–10 cm. long, 1/4 as long to as long as the middle leaflet.
Leaflets sessile or barely petiolulate.	Leaflets petiolulate.
Sepals narrowly to broadly oval, 2–4 mm. broad, abruptly clawed, rounded or obtuse at tip.	Sepals spatulate, oblanceolate or elliptic-lanceolate, 1–3 mm. broad, gradually narrowed to base, without claw, obtuse to subacute.
Blade of petal usually rhombic and as long as broad.	Blade of petal usually rounded-obovate and broader than long.
Carpels 1–7 (usually 3 or 4); the body of the mature follicle 3.5–5 mm. long, with beak (style and stigma) 1.5–2.5 mm. long.	Carpels 3–9 (usually 5 or 6); the body of the mature follicle 5–9 mm. long, with beak 2.5–4 mm. long.
Seeds densely crowded, completely filling the follicle, quadrate in cross-section.	Seeds not crowded, about half-filling the follicle, rounded in section.

From the above analysis it is apparent that, although very closely related, the eastern Asiatic (and Alaskan) plant and the eastern American (and Greenland) plant have quite definite individual tendencies, the Asiatic inclining to proportionately longer petioles, essentially sessile leaflets, broader rounder-tipped sepals with definite claw, more rhombic petals, fewer carpels, smaller follicles, shorter beaks and more crowded and somewhat quadrate seeds; the eastern American with petioles averaging shorter, the leaflets definitely petiolulate, the sepals narrower and without claw, the petals with

[1] Hultén, Fl. Kamtschatka and Adj. Isl. ii. 102 (1928).

more dilated blade, the carpels usually more numerous, the follicles larger and longer-beaked, and the less crowded seeds not quadrate. Completely isolated as they are, they constitute two very strong geographic varieties or, presumably, two distinct species. Until more transitional material than we yet know comes to hand it seems more reasonable to treat them as two species, which, however, may eventually be merged.

Coptis trifolia (L.) Salisb. Trans. Linn. Soc. viii. 305 (1807) went back to *Helleborus trifolius* L. Sp. Pl. ed. 2, 784 (1762). Linnaeus there gave only a brief account:

> trifolius. 5. HELLEBORUS scapo unifloro, foliis ternatis. *Amoen. acad. 2. p. 356. t. 4. f. 18. Kalm. it. 3. p. 379.*
> *Habitat in* Canadae, Siberiae *sylvis nemorosis cum Oxalide, Circaea.*

This account was as thorough a blending of the references to the eastern Asiatic and the eastern American plants as could be imagined. The only descriptive phrase and the citation Amoen. Acad. go back to the description by Linnaeus's pupil, Halenius, in his thesis, *Plantae Camschatcenses Rariores*, Amoen. Acad. ii. 356 (1751) and illustrated by t. 4, fig. 18; Linnaeus in 1762 merely transposing the order of his descriptive phrases. The second reference in 1762, to Kalm, was obviously to the Canadian plant, as were also the statement of habitat and of association of the plant with *Oxalis* and *Circaea*. In his journal of August 13, 1749 at Lorette, Quebec, Kalm said (I quote from the later English ed.): "The three-leaved Hellebore (*Helleborus trifolius*) grows in great plenty in the woods, and in many places it covers the ground by itself. However, it commonly chooses mossy places, that are not very wet; and the wood-sorrel (*Oxalis Acetosella*, Linn.), with the *Mountain Enchanter's Nightshade* (*Circaea alpina*, Linn.) are its companions."[1] In 1762, when he formally published the binomial *Helleborus trifolius*, Linnaeus used the diagnosis originally given in 1751 for the Kamtchatkan plant alone and his (or Halen's) original description of the latter was very detailed:

> 18. HELLEBORUS foliis ternatis, scapo unifloro. *Fig. 81* [18].
> RADIX fibrosa, filiformis, repens, perennis.
> FOLIA radicalia ternata: *Foliolis* sessibilibus, obverse ovatis, extrorsum magis gibbis, argute serratis, rigidiusculis, glabris, venosis. *Petioli* filiformes, folio longiores.

[1] Kalm, Travels into North America, trans. Forster, iii. 160, 161 (1771).

SCAPUS solitarius, filiformis, petiolis duplo longior, instructus *Bractea* subovata.
FLOS solitarius, magnitudine floris *Trientalis.*
COROLLAE *Petala* quinque, ovata, basi in ungves attenuata, alba, striata, *fig. a.*
Nectaria petalis saepius plura, lutea, limbo ovata, basi attenuata in cylindrum perforatum, petalis dimidio breviora.
STAMINUM *Filamenta* capillaria, alba, plurima nectariis vix longiora. *Antherae* albae, subrotundae, erectae. *fig. b.*
PISTILLI *Germina* quinque compressa. *Styli* filiformes, longitudine staminum, recurvi. *Stigmata* obtusa. *fig. c.*
PERICARPIUM *Capsulis* quinque, acuminatis, compressis, coadunatis margine interiore.
SEMINA plurima.
Minima est haec planta in suo genere, attamen spectabilis; inter Flores Sibiriae speciosos & maxime singulares est etjam quaedam Fumaria *bulbosis affinis, floribus condecorata, in suo genere maximis.*[1]

This original account of the Kamtchatkan plant, illustrated by a characteristic figure[2] and clearly defining the distinguishing characters ("*Foliolis sessibilibus,*" "COROLLAE *Petala* [Linnaeus called the sepals petals and the petals nectaries] ovata, basi in ungves attenuata," "*Nectaria* . . . limbo ovata"), must be taken as the true basis of *Helleborus trifolius* and consequently of *Coptis trifolia;* and it is necessary to find the proper name for the plant of northeastern America and Greenland. Fortunately, this is not difficult. Our plant was described and illustrated as "*Anemone, groenlandica, foliis ternatis serratis, scapo unifloro nudo.* Locus. In Groenlandica" by Oeder, Flora Danica, iv. fasc. x. 5, t. dlxvi (1770). The binomial,

[1] Halen's thesis, defended before Linnaeus and others at a public examination at Upsala, December 22, 1750, is of more than usual interest, for in it (§ V) he pointed out, probably for the first time, the similarity of the floras of eastern Asia and eastern America: "& denique quasdam etjam cum Canadensibus easdem, argumento Canadam a Camschatca non longe distare, uti sequentes antea in sola America boreali visae nunc etjam in extrema ora Sibiriae: sicut." Then followed an enumeration, including "CLAYTONIA foliis linearibus," i. e. *C. virginiana* L. of eastern America paired with *C. arctica* Adams of northeastern Asia; "ANEMONE caule dichotomo, foliis sessibilibus amplexicaulibus palmatis," the eastern Asiatic *A. dichotoma* L. and the eastern American *A. canadensis* L., formerly treated as a single species; "PARIS foliis ternis, flore pedunculato erecto," *Trillium camtschaticum* Pallas and other eastern Asiatic species similar to *T. erectum* L. and other eastern American species; and eight other genera, ending with "SWERTIA corollis quadricornibus," i. e. *Halenia*—the genus named by Borchkausen for Halen—with the Siberian *H. corniculata* (L.) Druce very close to the eastern American *H. deflexa* (Sm.) Griseb., which were long treated as a single species.

[2] In the original figure the leaves were shown as deeply 3-lobed, not 3-foliolate, consequently Lamarck, Encycl. Meth. iii. 98 (1789), altered the name to *Helleborus trilobus.* Salisbury, too, prior to his publication of *Coptis*, disliking the specific name, altered it (without nomenclatural authority) to *H. pumilus* Salisb. Prodr. 374 (1796); and Rafinesque transferred *H. trifolius* to a proposed new genus (published without a word of differentiation) as *Chryza borealis* Raf. Med. Repos. Hex. ii. v. 352 (1808) and *Chrysa borealis* Raf. Desv. Journ. Bot. ii. 170 (1809).

Anemone groenlandica, has always been ascribed to Oeder as published at this time; but recently there has been doubt as to whether Oeder really intended at this time to use binomials. Slightly later, however, Gunnerus, Fl. Norvegica, pt. 2: 139 and in index (1772) took up *Anemone groenlandica* as a definite binomial, referring directly back to Oeder's original publication; and in the preface to this part and, especially in the introduction to the 1st part (1766), Gunnerus made it clear that he intended the first two names of his descriptions as true binomials. These names and descriptions of Oeder were taken over unchanged by Gunnerus, who, by his clear explanation of them as binomials and his indexing of them as unequivocal binomials, definitely validated them. The plant of northeastern America and Greenland, treated, at least for the present, as a species must be called, then

COPTIS **groenlandica** (Oeder), n. comb. *Anemone groenlandica* Oeder, Fl. Dan. iv. fasc. x. 5, t. dlxvi (1770); Gunnerus, Fl. Norveg. pt. 2: 139 and in index (1772). *Helleborus triolius* L. Sp. Pl. ed. 2, 784 (1762), as to Canadian plant only, not *H. foliis ternatis* L. Amoen. Acad. ii. 356, t. 4, fig. 18 (1751). *C. trifolia* Salisb. Trans. Linn. Soc. viii. 305 (1807), in part only.

GRAY HERBARIUM.

SOME INTERESTING PLANTS FROM MT. KATAHDIN.—During a trip to Mt. Katahdin, Maine, last summer, the writer collected the following plants, not previously reported from the mountain.

LYCOPODIUM CLAVATUM L. var. MONOSTACHYON Grev. & Hook. The short-spiked, short-stalked variety was found at the head of the Saddle Slide. The only other station in New England for this variety is on Mt. Washington.

STREPTOPUS OREOPOLUS Fernald. Abundant on damp slopes above timber line in both the North and South Basins. The first record from Maine.

EPILOBIUM PALUSTRE L. var. LABRADORICUM Haussk. Damp gully, North Basin. Known elsewhere in New England only from Mt. Washington.

LEDUM GROENLANDICUM Oeder. All specimens of *Ledum* collected proved to be this species, although careful search was made, particularly about Monument Peak, for *L. palustre* L. var. *dilatatum* Wahlenb. Professor Fernald, on re-examination of the single specimen in the Gray Herbarium, collected by Thurber, which is the only basis for the record of the latter species from Mt. Katahdin in Gray's

Manual, has concluded that it is merely a peculiar form of *L. groenlandicum*, so it is probable that *L. palustre* var. *dilatatum* does not occur in New England.—G. L. Stebbins, Jr., Harvard University.

Lomatogonium rotatum (L.) Fries in Maine.—While collecting on Schoodic Peninsula, Winter Harbor, Hancock County, Maine on August 4, 1928, the writer noticed growing abundantly about the brackish spray pools on the barren end of the point a gentian-like plant which was quite strange to him. On identification it proved to be *Lomatogonium rotatum* (L.) Fries, found in brackish marshes all through the Gulf of St. Lawrence region, but hitherto unknown south of the Magdalen Islands. The end of Schoodic Point, just to the east of Mt. Desert Island, has probably as great a concentration of sub-arctic types as any spot on the Maine Coast. *Sedum roseum* (L.) Scop., *Iris setosa* Pall. var. *canadensis* Foster, *Potentilla pectinata* Raf., *Euphrasia purpurea* Reeks var. *Randii* (Robinson) Fernald and Wiegand, and its forma *albiflora* Fernald and Wiegand are common, while the typical form of *Sagina nodosa* (L.) Fenzl. known from only two other stations in Maine, was also collected. Sepcimens of all these species are being deposited in the herbarium of the New England Botanical Club.—G. Ledyard Stebbins, Jr., Harvard University.

Josselyn Botanical Society of Maine.—The Thirty-fourth Annual Meeting of the Josselyn Botanical Society of Maine will be held July 9th to 12th, 1929, in the northern part of York County and the southwestern part of Oxford County, with headquarters at the "Hotel Malvern," Kezar Falls, Maine. The rates will be $3.00 per day, American plan. Kezar Falls is on state highway No. 25. The railway staiton is Cornish. Members who notify Mr. E. L. Giles, proprietor of the Malvern, may be met at the station. There is also a stage from Cornish. Kezar Falls is on the Ossipee River. The region, both north and south, is much diversified, with hills and valleys, well supplied with lakes and small streams. That part of York County which may be easily reached by collecting parties has shown several plants of southern ranges, and it is hoped that others

may be found during this meeting. The usual programme of the Society, consisting of daily collecting trips, with examination of specimens and short talks evenings, will be followed. It is urged that members and guests planning to attend the meeting write to Mr. E. L. Giles, proprietor of the Malvern, Kezar Falls, Maine, as early as possible for rooms.

For further information write Miss Abbie F. Minott, *Secretary*, Phippsburgh, Maine.

Vol. 31, no. 366, including pages 101 to 120 and plate 187, was issued 5 June, 1929.

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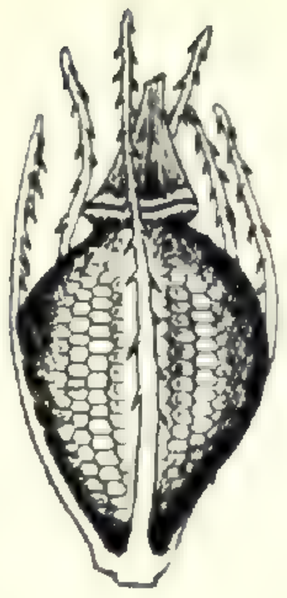
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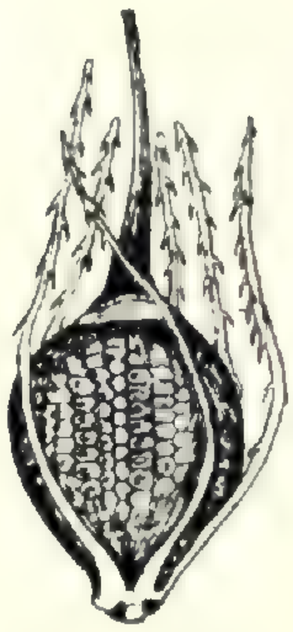
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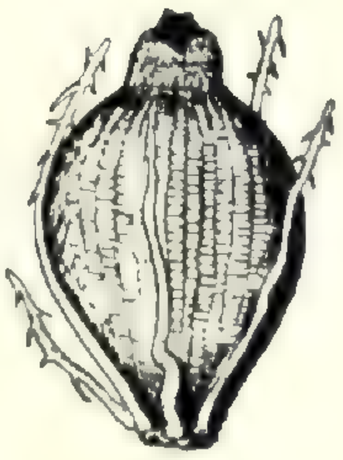
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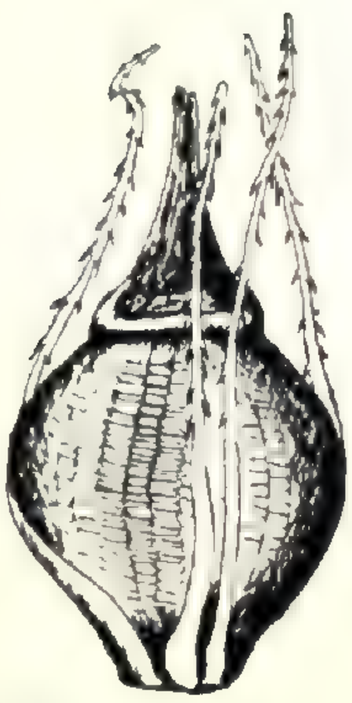
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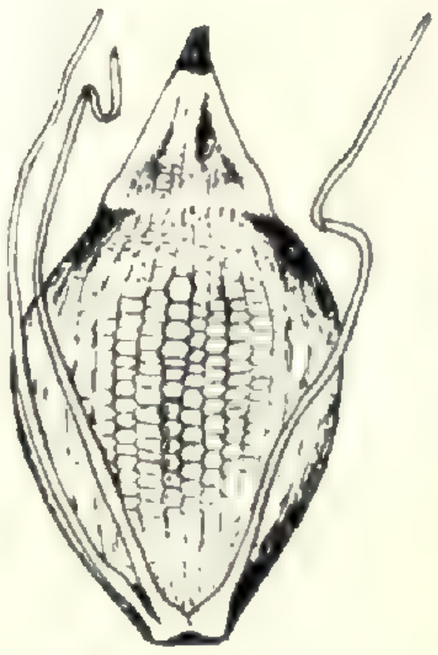
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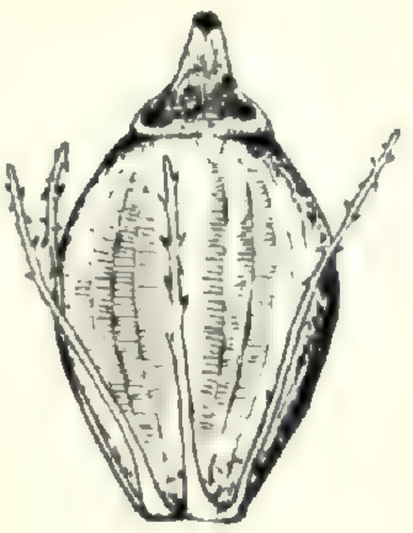
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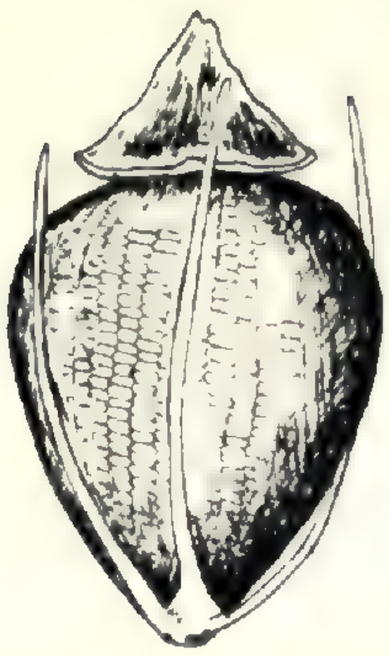
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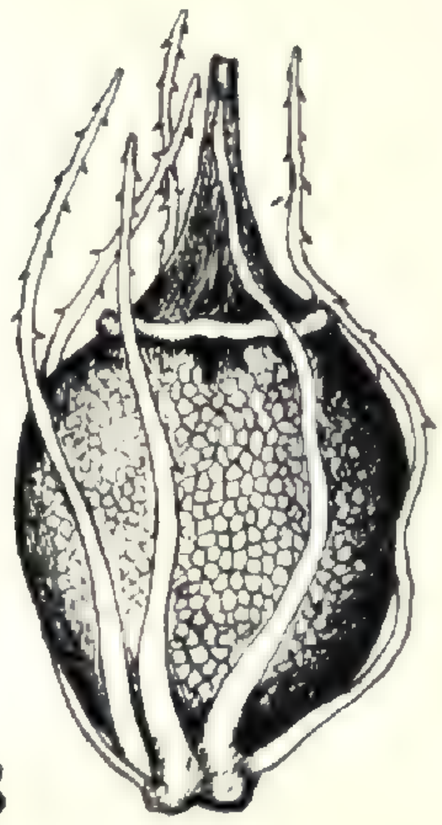
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HKS

H. K. Svenson del.

Eleocharis, series Mutatae

(Achenes × 10)

Fig. 1, E. equisetoides; 2, E. interstincta; 3, E. fistulosa; 4, E. quadrangulata; 5, E. Robbinsii; 6, E. elongata; 7, E. plicarhachis; 8, E. mutata; 9, E. philippinensis; 10, E. variegata var. laxiflora; 11, E. cellulosa; 12, E. spiralis; 13, E. fistulosa var. robusta; 14, E. equisetina; 15, E. sphacelata; 16, E. dulcis.

Δ

Farlow Bot Lab.

RHODORA

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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

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NOTES ON FALL-FLOWERING PLANTS OF THE CENTRAL MISSISSIPPI RIVER VALLEY

H. C. Benke

Findings in the genus *Aster* during my trip in the fall of 1927, across Illinois southward as far as the region about St. Louis, Mo., were given in the April, 1928 issue of Rhodora. The succeeding aster-flowering season—fall of 1928—found me on the way early and on a more extensive trip which carried me overstate and zig-zaging from one side of the great Mississippi River to the other as far south as the northern borders of the state by the same name and the adjoining state of Arkansas across the river on the west.

During the entire trip and over the whole season when asters were in flower, extending even beyond the time of frosts, unusual or new specimens were secured, ranges were observed, colorations noted and many field notes jotted down, the more interesting of which are here recorded. Plants of other genera in flower and fruit at the time also came under observation—and these were not slighted but scrutinized as well, furnishing additional material which is included in this paper as being of possible help in taxonomic work.

So, in *Gramineae* it was noted that in our northern range (northern Illinois) the species *Agrostis alba* L. was, in the main, of erect habit—scarcely decumbent. On proceeding southward the species was more and more tending to become stoloniferous and rooting at many nodes. Pastures were not considered but the species was sought out in woodlands or other uncultivated areas where it could have been more thoroughly naturalized. To illustrate this peculiarity, a specimen has been placed in Field Museum from Bloomfield, Johnson County, Ill., *Benke 4664*. Anomalous, in this connection, is this character

as observed in the species *Leersia oryzoides* (L.) Sw. (*Homalocenchrus oryzoides* (L.) Poll.) which is mostly decumbent in its habit in the Chicago region, while specimens seen down-state were very strict, as a rule. On file from the same locality as before, is *Benke 4669* which gives a fair sample of this species through that region. This item, probably, is more of ecological interest.

About Anna, Union County, Ill., were found specimens of *Aristida dichotoma* Michx. (*Benke 4692*), sparingly established in the hilly woodlands, which were very weak but tall; no other characters could be uncovered to warrant the separation of a variety or form from the species. A specimen similar to mine is in Field Museum Herbarium: ILLINOIS: barrens, Menard County, *E. Hall*, Museum no. 314281.

A sharp lookout was kept for *Arundinaria tecta* (Walt.) Muhl. as the journey proceeded southward, but no colonies of plants were observed until the streamlets of the Illinois Ozarks were reached in Johnson County—*Benke 4696*. When one first sees this plant—cane-brake, along with cypress, magnolia and live-oak species—he begins to feel that he has arrived in the "Southland" indeed. In Field Museum are also specimens of *Arundinaria* from farther north but in the Wabash River Valley. ILLINOIS: Richland County, *Ridgway 155; 263;* Mt. Carmel, Wabash County, *Patterson*, Museum no. 135116.

Specimens of *Froelichia* which conform to the characters of *F. gracilis* Moq.—a plant of the western plains—were seen about Cairo, Ill. (*Benke 4714*) and the tropical weed *Boerhaavia erecta* L. was found nearing its northern range-limit toward the Missouri-Illinois border. The specimen on file in Field Museum is from Hulbert, Arkansas (*Benke 4715*).

Lespedeza striata (Thunb.) H. & A. of the Illinois hill country, running wild beyond Bloomfield (some miles to the northeast) is not of the usual diffusely branched prostrate habit but quite erect and but little branched or nearly simple (*Benke 4876*).

A fine specimen of *Rhamnus cathartica* L. was found established in the virgin woodlands about Trout Park, north of Elgin, Ill. (*Benke 4742*) far removed from any cultivated area. From the same territory all specimens examined of *Psedera quinquefolia* (L.) Greene proved to be of the variety *hirsuta* (Donn) Rehder (*Benke 4743*).

It was interesting to observe the very showy *Passiflora incarnata* L. running perfectly wild and thoroughly established so far north as

the region about Metropolis, Massac County, Ill. (*Benke 4747*). Possibly it should be regarded as native to the region.

About Elgin, Ill. a number of specimens of *Sanicula* were studied. But they all proved to be *S. gregaria* Bicknell (*Benke 4754*).

The curious fact was noted that all plants of the species *Asclepias perennis* Walt. of the region about Cairo, Ill. had *very bright green* stems, quite striking even from a considerable distance (*Benke 4757*). Another curious sight arresting one's attention was observed along the lowlands of the Ohio River about Metropolis, Massac County, Ill. where Ipomaeas of several species—*I. coccinea* L., *I. lacunosa* L. and *I. purpurea* (L.) Lam.—red- white- and blue-flowering were intertwined and all blooming together, yet all distinct with no signs of hybridism apparent! Specimens were taken to be placed in the Field Museum Herbarium together with duplicates.

Several examples of exceeding thrift and vigor in plants under favorable conditions may be cited: in the rich bottoms of the Mississippi about Cairo, Ill. there were some great individuals of *Scutellaria lateriflora* L., bushes of nearly two meters in diameter and a meter in height! (*Benke 4774*). *Lobelia cardinalis* L. showed similar tendency to attain exceptional size about Horn Lake, Mississippi (*Benke 4788*). And *Boltonia asteroides* (L.) L'Hér. in some colonies about Niles (northwest of Chicago) forms regular "jungles," the plants running between two and three meters in height.

In the neighborhood of Trout Park, Elgin, Ill. the white-flowered form of *Solanum Dulcamara* L.—forma *albiflorum* House—as a rule seen only occasionally, occurs quite as frequently as the species with purple flowers, or even more so.

About Justice Park, Chicago, several colonies of *Aster Drummondii* Lindl. were found which were of lower stature than common and the stems, and leaves on their upper surfaces, were very rufescent but the separation of a variety or form on these characters alone does not seem justifiable unless study from season to season discloses that these differences are permanent (*Benke 4882*).

There was seen to the north of Elgin near Trout Park Preserve a considerable colony of Asters reminding one at a glance of the inflorescence of *Aster lateriflorus* (L.) Britton but of the leaf-characters of *Aster lucidulus* (Gray) Wiegand. By closer study these intermediate characters become quite apparent, strongly suggesting that the colony may be of hybrid origin, especially since the two species

mentioned grew in the closest proximity. Specimens were taken in duplicate (*Benke 4833*) but as the plants of the entire colony were unsound, the branchlets, smaller leaves and bracts, more especially, having been attacked, it appears, by a rust of some kind, a hybrid cannot now be announced and published, the colony requiring further observation for another year or longer. It may be a case for phytopathology rather than for taxonomy!

It is now in order to cite the apparently new material secured on the extended trip.

I. To the northeast of Memphis, Tennessee there was found a species of *Uniola* resembling *U. laxa* (L.) BSP. but at once striking for its lengthened nodding filiform culm, nearly simple inflorescence and single-flowered spikelets. On account of the latter, its most striking character, it may be called

Uniola uniflora, spec. nov., *U. laxam* simulans; culmis fragilioribus, supra cernuis, filiformibus; panicula spiciformi simplicissima vel remote pauciradiata, radiis brevissimis, 1- raro 2-spiculatis; spiculis 1- raro 2-floris; glumis 3–3.5 mm. longis aliquam hyalinis (praecipue palea) plerumque eroso-ciliatis.—TENNESSEE: Memphis, Sept. 19, 1928, *H. C. Benke 4874* (TYPE, Field Museum).

In its character as to roots, length of culms and width and length of leaves resembling *U. laxa* (L.) BSP. (*U. gracilis* Michx.) but differing by its weaker culms, nodding and filiform; inflorescence long and distantly spicate—a simple spike or at most one to several very short and distant branches (which bear one or two one-flowered spikelets); spikelets single-flowered, rarely two-flowered; florets with their glumes averaging conspicuously smaller, 3–3.5 mm. in length; the flowering glumes, and palea particularly, more delicately hyaline in texture, mostly erose or even erose-ciliate margined.

That the new species cannot be regarded as a weak development of *U. laxa* may readily be seen by comparing it with depauperate specimens of that species which run to stronger culms, definitely larger and multi-flowered (3–6) spikelets, even in the weakest plants as observed both in the field and in the herbarium. Both *U. laxa* (L.) BSP. and *U. longifolia* Scribn. are well-represented in the Field Museum Herbarium, many of the former under its synonym *U. gracilis* Michx., and one specimen entered as such is very typically the new species: VIRGINIA: Richmond, Sept. 26, 1894, *J. J. Carter*, Museum no. 218798.

On reaching the region about Horn Lake, Mississippi, some thirty miles further south, *U. uniflora* was not seen but *U. laxa* and *U. longifolia* were both met with in quantity, but in distinct colonies—best seen in the field—and none were found growing together. All the species, including the new one, were found growing at the edge of rich woods and pastures.

II. Along the streamlets of the Illinois Ozarks beyond Bloomfield and nearing Tunnel Hill in Johnson County a very striking form of *Oxalis* was encountered at several places—remarkable for its viscid-hairiness, on the stem actually woolly! This character was so pronounced that it was noticeable even at a distance, as soon as the plant appeared in sight. The attention was also arrested by the unusually small size of the flowers and their *deep yellow* color.

In the genus *Oxalis* or the Wood-sorrels, it is realized that great caution must be observed in separating varieties or even forms because of the many synonyms and the insecure, indefinite or merging characters. But since specimens in the herbarium of the Field Museum and literature at hand fail to uncover specimens similar to mine it seems necessary to name a new variety:

OXALIS EUROPAEA Jord., var. **lanulosa**, var. nov., caulibus petiolis pedicellisque dense pubescentibus cum pilis viscoso-lanosis; foliis supra plus minusve strigosis vel pilosis; petalis 3–5 mm. longis, intense luteis.—ILLINOIS: Bloomfield, Johnson County, Sept. 22, 1928, *H. C. Benke 4877* (TYPE, Field Museum).

Like the species in inflorescence, size-range of flowers, "stipules obsolete or nearly so," etc.; but stem densely to loosely viscid-woolly; petioles, pedicels, sepals and capsules less so, at least strongly viscid-villous; leaves strigose-pilose on upper surface, some densely so; petals conspicuously small (flowers 3–5 mm. high), *deep* yellow.

Wiegand, in his recent very excellent and critical treatment of *O. corniculata* L. and its relatives, RHODORA 27: 136. 1925, separates the forma *vestita* Wiegand from the variety *Bushii* (Small) Wiegand of the species *europaea* Jord. This seems to be his nearest approach to my new variety. Two of the specimens which he cites are accessible in the Field Museum: ILLINOIS: La Salle County, *Greenman, Lansing & Dixon 144* and Riverdale, *Lansing 2625*. These two plants—of unlike branching habit—both differ from the new variety in the evidently larger petals (6–9 mm. long) very pale in color. This latter character, however, might have been somewhat modified by their preparation for the herbarium. They are pubescent to a

markedly less degree than any of my abundant material, secured from several colonies of the region and uniformly characterized by conspicuously long viscid spreading or tangled-woolly pubescence and small deep-yellow flowers.

III. Trout Park to the north of Elgin, Ill. is not a park in the usual sense, but rather a Preserve with its environs for a mile or so along the bluffy hillsides reaching to the valley of the Fox River, a bit of the original Illinois landscape with its wealth of flora now assured perpetuity by the city of Elgin, which has acquired a goodly portion and included it in its park system. But, unlike the other city parks, it is kept in its natural state as far as possible, having been placed in the custody of the various nature-conserving societies of the city. The region is most unique in that it contains innumerable springs and brooklets so that it is practically drought-proof and free from fire-danger. This makes it the home of age-old trees, among them grand specimens of ancient *Thuja occidentalis* L., White Cedar!

Among the profusion of wild asters that may be expected and which does flourish in such a place is one most conspicuous and beautiful, massed in colonies here and there about the park. Various persons have remarked to me about the abrupt transition in color from intensely blue to rose-red in a few of the colonies, in the same species, *Aster Shortii* Lindl. Having found no mention of this charming color-form, it pleases me to record it here as

ASTER SHORTII Lindl., forma **Gronemanni**, f. nov., ligulis roseis. Rays rose-red.—ILLINOIS: Elgin (north part), Kane County, Oct. 1, 1928, *Benke 4872* (TYPE, Field Museum).

This is named for CARL F. GRONEMANN of Elgin, an enthusiastic friend of the flora, President of the Illinois Nature Study Society, who took a leading part in the long campaign to save Trout Park Preserve and who first spoke to me about this attractive aster.

Since this color-form has not been seen elsewhere in my many travels it must be regarded as rare.

IV. *Aster Drummondii* Lindl. is a very common species in the vicinity of Chicago where it is well-marked, as a rule, so one encounters little trouble in its determination. We are used to seeing every shade of blue from very pale to the deeper shades and consequently, color-forms are not to be separated in the blue-rayed specimens. But when one comes upon such a rarity as this species with rose-colored rays and leaf-characters varying from the type

besides, a new variety of this ubiquitous (woodland, field and meadow) species should be separated.

ASTER DRUMMONDII Lindl., var. **rhodactis**, var. nov., strictior, pauce ramoso; ramulis numerosis axillaribus; ligulis roseis.—ILLINOIS: Chicago (Justice Park), Cook County, Oct. 5, 1928, *H. C. Benke 4830* (TYPE, Field Museum).

With the species but appearing rather taller because less branching; many leafy branchlets axillary; leaves smoothish on upper surface; rays rose-colored.

Type and duplicates were secured from several colonies growing in meadow-land to the west of the interurban station of Justice Park. They are very rufescent on stem and upper part of leaves but I should not maintain this to be an essential and constant character of this variety, with the limited observation given it. A specimen of the species with blue rays but with similar rufescence of stem and leaves has been referred to elsewhere in this paper.

V. Among other rarities in Trout Park Preserve and environs is found, in several small colonies, the white-flowered form of the charming *Aster lucidulus* (Gray) Wiegand, which has already been given a formal name but under a different species necessitating the following transfer:

ASTER LUCIDULUS (Gray) Wiegand, forma **albiflorus** (R. Hoffm.), comb. nov. *Aster puniceus* L., var. *lucidulus* Gray, forma *albiflorus* R. Hoffm. Proc. Boston Soc. Nat. Hist. **36**: 339. 1922.

As recorded by House, N. Y. State Mus. Bull. **254**: 703. 1923, white-rayed forms of *Aster puniceus* L., var. *firmus* (Nees) T. & G. have been collected in the state of New York at Hamlin by Beckwith, Pen Yan by S. H. Wright and at Lake Pleasant by Peck. These specimens have not been seen but it is strongly suspected that they may be of the same form as the above. The variety *firmus* of *A. puniceus* has never been satisfactorily separated by me for no specimen was ever encountered either in Wisconsin or in Illinois that would key to *A. puniceus* which was "smooth beneath and sparsely hirsute above" and also had "serrate leaves." All smooth-leaved asters of the group were always but *slightly* if at all denticulate and conformed well in all characters to the variety *lucidulus*, now raised to the rank of a species by Wiegand with the best of reasons, it seems to me, both from observation in the field and from examination of many herbarium specimens.

CHICAGO, ILLINOIS.

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS

H. K. Svenson

(*Continued from page 136*)

6. E. CELLULOSA Torr. FIG. 11. Culms terete, rarely triangular, 3–7 dm. high, 1–2 mm. wide, straw-colored or greenish: roots coarse, pale to dark brown; stolons elongated: the upper sheaths rigid, oblique, with an elongated mucronate tip, often purplish; lowest sheaths membranous and inflated or leaf-like: spikelets cylindric, 1.5–4.5 cm. long, obtuse, thicker than the culm: scales orbicular or obovate, obtuse, 4 mm. long, rigid, striated, straw-colored, with a conspicuous brown border and white scarious margins, the brown coloration sometimes wanting: style 3-fid: stamens 3: mature achene shining, brown, elliptic to obovate, lenticular, with about 20 rows of quadrangular cells, overlaid by a glass-like surface, merging at the summit into a stout, spongy beak, tipped by the short dark style-base: bristles light-brown, equaling the achene, involute, without teeth.—Ann. Lyc. N. Y. iii. 298 (1836); Britton, Journ. N. Y. Micr. Soc. v. 99 (1899); C. B. Clarke in Urb. Symb. Ant. ii. 62 (1900). *Scirpus dictyospermus* C. Wright in Sauv. Fl. Cub. 175 (1873).—Florida to Texas, West Indies, and Central America. FLORIDA: Santa Rosa Island, *Tracy* 8661; Appalachicola, Biltmore herb. (*Chapman*) 3870; Lee Co., Myers, *Hitchcock* 403; Dade Co., *A. A. Eaton* 105; S. Jacksonville, *Curtiss* 6540; Miami, *Garber* in 1877; Titusville, *Nash* 2302; W. Fla., Palm Creek, *Curtiss* 183; Key West, *Blodgett*. MISSISSIPPI: Biloxi, *Tracy* 6503; Horn Island, *Tracy* 7680; Bay of St. Louis (*Ingalls*) as *S. quadrangulatus* Michx. LOUISIANA: Lake Charles, *Cocks* 3126. TEXAS: Fredericksburg, *Engelmann* 494; *Lindheimer* 719; Rio Cabeza, *Thurber* 32 in 1850; *C. Wright* 708 (W. Tex. to El Paso), Rio Grande in 1848. BAHAMA ISLANDS: Andros, *A. E. Wight* 264; New Providence, *Britton & Brace* 505; *Britton & Brown* 305. CUBA: *C. Wright* 3763. YUCATAN: Progresso, *Gaumer* 2402.

Closely related to *E. spiralis*.[1] First described by Torrey from specimens sent from Bay of St. Louis, Mississippi, by Dr. Ingalls.

7. E. FISTULOSA (Poir.) Link. FIG. 3. Culms sharply triangular, coarse, 4–6 dm. high: roots coarse, reddish-brown: sheaths brown, membranous, rather loose, pointed at the summit: spikelets 1.5–3.5 cm. long, cylindric, acute: scales 4 mm. long, straw-colored or gray, broadly ovate, obtuse or somewhat acute, firm, striate; the margins erose but not conspicuously membranous: style 3-fid: stamens 3: achene 2–2.4 mm. long (including the style-base), obovate, turgid, green or light brown, rough, with about 20 rows of deeply pitted quadrangular cells, the apex narrowed to a neck about one-third the width of the achene, broadening again to form the base of the tri-

[1] See discussion under *E. spiralis*.

angular style: bristles coarse, usually exceeding the achene, firmly toothed.—Link in Spreng. Jahrb. iii. 78 (1820); Schultes, Mant. ii. 89 (1824); Boeckl. Linnaea, xxxvi. 472 (1869–1870); Benth. & Muell. Fl. Austr. vii. 293 (1878); C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 626 (1893), in Durand & Schinz, Consp. Fl. Afr. v. 598 (1895), in Thiselton-Dyer, Fl. Cap. vii. 198 (1898), in Thiselton-Dyer, Fl. Trop. Afr. viii. 406 (1902) and Ill. Cyp. t. xxxv. figs. 1–4 (1908); Fernald, Rhodora, xxvii. 39–40, t. 149, figs. 5–10 (1925). *Scirpus fistulosus* Poir. Encyc. vi. 749 (1804). *S. acutangulus* and *S. medius* Roxb. Fl. Ind. (ed. Wall.) i. 216 (1820). *Baeothryon fistulosum* A. Dietr. Sp. Pl. ii. 94 (1833). *Limnochloa acutangula* Nees and *L. media* Nees in Wight, Contrib. Bot. Ind. 114 (1834). *L. fistulosa* Nees, Linnaea, ix. 294 (1835). *E. planiculmis* Steud. Cyp. 80 (1855). —West Indies and tropical South America, Asia, Africa. Cuba: *C. Wright* 3375, 3376. Mexico: Orizaba, *Botteri* 756. Panama: Prov. Panama, Chepo, *Pittier* 4557. Colombia: Polonia, *Killip & Smith* 14914; Aguasucia, *Langlassé* 87; Dept. El Valle, Calima, *Killip* 11247. Galapagos Islands: Chatham Is., *Stewart* 1080. Bolivia: Dept. Santa Cruz, Prov. Sara, *Steinbach* 7444. Paraguay: Sierra de Maracayu, *Hassler* 5676; Cordillera de Villa-Rica, *Hassler* 8589; N. Paraguay, *Fiebrig* 5349. Ceylon: *Thwaites* 3162. India: Nepal, *Wallich;* mountains of Khasia, *Hooker & Thomson.* China: Hupeh, *Henry* 4102. Japan: Katsura, *Sakuraj* 51. Sierra Leone: *Elliot* 4453. Central Africa: Djur, *Schweinfurth* 2326.

Described by Poiret (1804) from specimens collected by Du Petit-Thouars in Madagascar, and by Roxburgh (1820) from India as *Scirpus acutangulus* (*S. medius* is only a smaller form, less sharply angled). Clarke included the American plant under *Eleocharis mutata,* but Boeckeler, as noted by Fernald (l. c.), recognized the American plant as *E. fistulosa. E. planiculmis* was based on *Zollinger* 284 from Java. In the turgid, almost globose achenes, with coarse reticulation, and stout bristles, it seems related to *E. variegata* var. *laxiflora* and *E. philippinensis.* The characteristics differentiating *E. fistulosa* from *E. quadrangulata* and *E. mutata* have been clearly discussed by Fernald (l. c.). According to Clarke (in Thiselton-Dyer, Fl. Trop. Afr. viii. 406), "the corresponding species in Tropical America, *E. mutata,* R. Br., is exceedingly near this, and is united with it, perhaps rightly, by Boeckeler." This statement is not wholly correct; Boeckeler considered *E. mutata* synonymous with *E. spiralis* (Boeckl. l. c. 473). *Schweinfurth* 2326 from Central Africa, has achenes 2.8 mm. long, with a short neck one-half as wide as the achene, and with linear transverse cells. The bristles are without teeth and do not exceed the achene. This was described by Boeckeler,

Flora, lxii. 563 (1876) as *E. fistulosa* var. (β) *robusta* "culmo validiore 2½–3 lin. diam. haud compresso, rhizomate elongato lignoso-duro perpendicul. descendente"; it may represent a distinct species.

8. E. ROBBINSII Oakes. FIG. 5. Culms slender, 1–2 mm. wide, 2–7 dm. high, triangular, sometimes producing tufts of capillary stems which float in the water: roots either fibrous or spongy; stolons slender and elongate, the nodes inconspicuous: sheaths dull-brown; the summit oblique: spikelet 1–2.5 cm. long, acute, scarcely wider than the culm: scales few (4–9), lanceolate, 7 mm. long, greenish, striate, the margins and tip scarious, with a keel formed by 2 or 3 prominent longitudinal ridges: style 3-fid: stamens 3: achenes brown, 2–2.5 mm. long (not including the slender, elongate style-base), oblong-obovate, narrowed below the middle, lenticular, rarely triangular, turgid, with 15–18 rows of shallow, transversely linear-rectangular cells, narrowed at the apex to a neck one-half the width of the achene, broadening again to form the base of the flattened style: bristles 7, closely and firmly toothed, twice as long as the achene. —Hovey's Mag. Hort. vii. 178 (1841); Britton, Journ. N. Y. Micr. Soc. v. 99 (1889); Robinson & Fernald in Gray, Man. ed. 7, 181, fig. 240 (1908). *E. variegata* Boeckl. Linnaea, xxxvi. 471 (1869–1870) in part.—In shallow water at the borders of ponds, Nova Scotia and southern New Brunswick to Florida, chiefly on the coastal plain, and westward through central New York to Michigan, Indiana and Ontario. The following, from the numerous specimens examined, are typical. NOVA SCOTIA: Belle Isle, *Fernald et al.* 23363; Five Island Lake, *Fernald et al.* 23364; Tiddville, *Fernald & Long*, 20126; Argyle, *Pease, Long & Linder* 20124; Windsor Junction, *Howe & Lang* 404. NEW BRUNSWICK: Kendrick's Lake, St. Stephen, *Macoun* 32222 (C.). MAINE: Wilton, *Fernald* in 1894. NEW HAMPSHIRE: Wentworth, *E. F. Williams* in 1908. MASSACHUSETTS: Spot Pond, *Oakes* in 1865; Newton, *Oakes* in 1864; Dedham, *Faxon* in 1878; Plymouth, *Boott* in 1864, *Oakes* in 1839; Brewster, *Fernald* 16296; Yarmouth, *Fernald & Long*, 8841; Springfield, *M. L. Owen* in 1880. RHODE ISLAND: Cranston, *Olney*. CONNECTICUT: North Guilford, *Bartlett* in 1906; Salisbury, *Bissell* in 1906; Monroe, *Eames* in 1895. NEW YORK: Wading River, *E. S. Miller* in 1871. NEW JERSEY: Forked River, *Long* 5283; Quaker Bridge, *Parker* in 1867; Delanco, *Van Pelt* in 1907; Dennisville, *Parker* in 1866. DELAWARE: Felton, *Canby* in 1874. GEORGIA: Lee Co., near Rift, *Harper* 1068. FLORIDA: *Chapman* (Quincy, according to Chapman, Fl. S. U. S. 515, 1860). ONTARIO: Temagami Forest Reserve, *W. R. Watson* 442 (C.). MICHIGAN: Park Lake near Agricultural College, *Wheeler* in 1890; Pine Lake near Agricultural College, *Wheeler* in 1897. INDIANA: Dune Park, *E. J. Hill* in 1897 and 1898, *Umbach* in Kneucker, Cyp. et Junc. Exsicc. 225.

Described by Oakes from ponds in northern New Hampshire and

southeastern Massachusetts. In outward appearance close to *E. variegata* var. *laxiflora*, from which it differs in its smaller stature, more slender stolons, longer scales, and in the elongate, shiny, less turgid achenes conspicuously narrowed at the apex. It also has a superficial resemblance to *E. philippinensis*. Specimens collected by Wheeler in Michigan in 1890 differ from the typical *E. Robbinsii* in having the tubercle not contracted at the base, and bristles not exceeding the achene. A few of the achenes which were examined were triangular.

9. E. ELONGATA Chapm. FIG. 6. Culms very slender, usually less than 1 mm. in width, elongated, 5–8 dm. long, often floating on the surface of the water, flattened or obscurely angled: roots fibrous; stolons abundant, brown or straw-colored, elongated, with culms rising from the nodes; spikelets 1–1.5 cm. long, 2 mm. wide, acute: style 3-fid: stamens 3: scales linear, obtuse, 3.5 mm. long, striate, greenish, conspicuously bordered with brown just within the hyaline margin: achenes 1.5 mm. long including the style-base, triangular, light green, obovate (the inner face broadest, with about 12 rows of coarse transversely linear cells), abruptly narrowed at the summit to a short neck one-fourth the width of the achene, from which rises the short acute deep-brown style-base: bristles 6 or 7, equalling the achene, greenish, prominently toothed.—Fl. S. U. S. 515 (1860); Small, Fl. Se. U. S. 182 (1903).—This species is confined to Florida. The following specimens are cited from the Gray Herbarium. FLORIDA: Eustis, Lake Co., *Nash* 944; Lake Como, Putnam Co., *Curtiss* 6674; Dade Co., *Garber* in 1877; *Chapman*.

This plant is closely allied to *E. Robbinsii*. The achenes are characteristically triangular, in this respect differing from any other members of the group, although occasionally triangular achenes occur in *E. Robbinsii*.

10. E. **philippinensis**, n. sp. (FIG. 9), culmi elongati 3–5 dm. alti, circa 2 mm. diametro; radicibus brunneis, stolonibus longis nodis manifestis; vaginis ad apicem laxis; spiculis cylindricis 2–5 cm. longis circa 3 mm. crassis; squamis fusco-viridescentibus quadrifariis subulatis vel lanceolatis circa 4 mm. longis striatis carinatisque, apice exsertis subsquarrosis; achaenio 2–2.3 mm. longo obovato infra medium angustato biconvexo turgido fusco latere utroque cum cellulis hexagonis 15–20-seriatis striato, ad apicem annulo toroso truncato instructo achenio quarto parte angustiore; stylobasi complanato; setis 7, serie interiori apicem stylobasis, serie exteriori apicem achenii aequante retrorsim cum dentibus firmis scabris—*E. variegata* var. *laxiflora* Merrill, Enum. Phil. Pl. 121 (1922), not Clarke.—PHILIPPINE ISLANDS: Luzon, Prov. Bulacan, *Ramos* in Merrill, Phil. Pl.

1461; Prov. Rizal, *Merrill* in Oct. 1909; Prov. Rizal, July, 1906, *Ramos* 1112 (TYPE in Gray Herb.).

This plant differs from *E. variegata* var. *laxiflora* in the soft culms and sheaths, in the slender, elongate spikelet with its spreading scales; in the smaller, more truncate achene, with hexagonal cells (in *E. variegata* var. *laxiflora* the cells are transversely linear); and in the shorter, unequal bristles. It is also related to *E. plicarhachis* of the New World.[1] The hexagonal markings of the achenes and the slender spikelets coincide with Clarke's illustration of the Australian *E. nuda*,[2] but the scale in the illustration is blunt and bristles are lacking. *E. philippinensis* may perhaps constitute a variety of *E. nuda*.

11. E. VARIEGATA (Poir.) Presl in Oken, Isis, xxi. 269 (1828); Kunth, Enum. ii. 153 (1837); Boeckl. Linnaea, xxxvi. 470 (1869–1870), in part. *Scirpus variegatus* Poir. Encyc. vi. 749 (1804). *E. Sieberi* Kunth, Enum. ii. 153 (1837). *Bacothryon variegatum* A. Dietr. Sp. Pl. ii. 92 (1833).

I have seen no authentic material. *Scirpus variegatus* was described by Poiret from specimens collected in Madagascar by Du Petit-Thouars, which, according to Presl and Kunth, are represented in the Willdenow herbarium. In Durand & Schinz,[3] Consp. Fl. Afr. v. 601 (1895), the Asiatic material is referred to var. *laxiflora* C. B. Clarke (*E. laxiflora* Thw.), and *E. Sieberi* (based on *Sieber* 19 from Mauritius, considered by Kunth as probably identical with *Scirpus variegatus*) is included as a synonym. Typical *E. variegata*, therefore, seems to be confined to Madagascar and Mauritius. The distribution is stated by Clarke as India, China, Malaysia, Polynesia and Cuba, but the Philippine plants are clearly distinct, and so is the Cuban material (*E. plicarhachis* = *E. elata*).[4] As treated by Boeckeler,[5] *E. Robbinsii* from North America is included under *E. variegata*, and *E. Sieberi* is maintained as a distinct species.

Var. LAXIFLORA (Thw.) C. B. Clarke. FIG. 10. Culms slender, terete or obscurely angled, striate, sulcate, 3.5–6 dm. high, rigid and flexuous, about 2 mm. wide: stolons thickened: sheaths firm, closely appressed at the summit, pointed, purplish at the base: spikelets 1–2 cm. long, cylindric or somewhat angled: scales rigid, lanceolate, 5 mm.

[1] See discussion under *E. plicarhachis*.

[2] Clarke, Ill. Cyp. t. xxxv, figs. 8–10 (1909).

[3] The text was contributed by C. B. Clarke.

[4] C. B. Clarke maintained *E. elata* as a distinct species. Kew Bull. Add. Ser. viii. 105 (1908).

[5] Linnaea, xxxvi. 471 (1869–1870).

long, often keeled, straw-colored or light brown: style 3-fid: stamens 3: achene rough, elliptic, 2.5–3 mm. long (including the style-base), biconvex, turgid, light-brown, with about 20 rows of transversely linear cells, the longitudinal ridges prominent, and an annular prominence at the somewhat narrowed apex, from which the flattened brown style-base rises: bristles 6 or 7, light-brown or yellow, coarse, strongly toothed, all exceeding the beak (style-base).—Clarke in Hook. f. Fl. Brit. Ind. vi. 626 (1893)[1] and in Durand & Schinz, Consp. Fl. Afr. v. 601 (1895), not C. B. Clarke, Cont. U. S. Nat. Herb., x. 455 (1908) nor Merrill, Enum. Phil. Pl. i. 121 (1922). *Scirpus laxiflorus* Thw. Pl. Zeyl. 435 (1864). *E. ochrostachys* Steud. Cyp. 80 (1855). *E. subulata* Boeckl. Flora, xli. 412 (1858); Koorders, Excursfl. Java, i. 197 (1911).—Southeastern Asia and Fiji Islands. CEYLON: *Thwaites* 3762 (TYPE COLL.). CHINA: Hong Kong, *Hance* 13333. FIJI ISLANDS: Sandalwood Bay, *U. S. Exploring Exped.* (Wilkes Exped.) 1838–1842.

The above description is based mainly upon *Thwaites* 3762. Thwaites raised the question whether *Scirpus laxiflorus* was to be considered as a form of *Eleocharis Sieberi*.[2] This, it seems to me, is the chief reason for uniting the Du Petit-Thouars Madagascar plants with the plants from India, *i. e.* the consideration of *S. laxiflorus* as a variety of *E. variegata*. No authentic specimens of *E. variegata* have been seen by me, but the descriptions seem not applicable to the Indian material.

C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 626 (1893) cites *E. ochrostachys* from "MALACCA; *Griffith*. SINGAPORE; *Ridley*,—DISTRIB. Java, Borneo. . . *Spikelet* less than ½ in.—This does not differ much from very slender examples of *S. variegata* var. *laxiflora*, except by the numerous barren stems." *E. ochrostachys* was based upon *Zollinger* 291 from Java. The specimen under this number at the Gray Herbarium from "rice fields, Java" has only one fertile culm, and on that the spikelet is very small (5 mm.). Two of the remaining culms have rudimentary development of spikelets and the plant seems to have suffered adverse conditions, which may account for the reduction of fertile culms. Both the habit and achene are identical with those of *S. laxiflora*. Boeckeler described *E. subulata* from Griffith's collection from Malacca. This plant, which was without achenes, stood in Boeckeler's estimation closest to *E. ochrostachys* Steud. and *E. planiculmis* Steud. It was reduced

[1] Ridley's combination in Journ. Sing. Asiatic Soc. xxiii. 14 (1891) is without description or reference and a *nomen nudum*.

[2] Pl. Zeylan. 435 (1864).

to synonymy with *E. ochrostachys* by C. B. Clarke. The Wilkes Exped. specimen from Fiji is identical with a plant from the same expedition labeled "*E. obtusetrigona* Nees, Organ Mts. Brazil." There is evidently a confusion of labels.

12. E. **plicarhachis** (Griseb.), n. comb. Fig. 7. Erect from an ascending spongy rootstock, often with slender elongate rhizomes: culms wiry, flexuous, striate and sulcate, 2.5–6 dm. high: sheaths usually rigid, 4–8 cm. long, purplish or straw-colored, oblique at the summit: spikelets 1–2 cm. long, about 25-flowered, narrowly cylindric, acute: scales loose, 3.5 mm. long, linear, obtuse, striate, with an obvious midrib: style 2-fid: stamens 3: achene biconvex, 2 mm. long (including beak), light-brown, orbicular to obovate, with about 12 longitudinal rows of quadrate cells with upraised edges, narrowed at the summit and surmounted by a turgid annulus-elevation from which rises the deep-brown or black lanceolate style-base: bristles 6, exceeding the achene, coarse, flat, with strong scattered teeth.—*Scirpus plicarhachis* Griseb. Cat. Pl. Cub. 239 (1866). *E. elata* Boeckl. Vidensk. Medd. Kjöb. (1871) 151 (1871). *E. variegata* Boeckl. Flora, lxiv. 78 (1881), not Presl. *E. variegata* var. *laxiflora* Clarke in Urb. Symb. Ant. ii. 62 (1900) and Contr. U. S. Nat. Herb. x. 455 (1908), not *S. laxiflorus* Thw.—West Indies and South America. Cuba: *C. Wright* 3372 (type coll.). Paraguay: Lake Ipacaray, *Hassler* 12570 (as *E. elata*). Colombia: Dept. of Antioquia, Puerto Berrio, *F. W. Pennell* 3727.

Superficially resembling *E. philippinensis*, from which it differs in the shorter spikelet (in *E. philippinensis* the spikelet is 2.5–5 cm. long) and more appressed scales. In *E. philippinensis* the achenes are longer (2.2–3 mm.), more opaque, with hexagonal, more deeply-pitted cells and surmounted by a wider annulus and with a style-base similar in color to the achene; the bristles also are coarser and equipped with more numerous teeth. *E. plicarhachis* is also similar to *E. variegata* var. *laxiflora*, which has a much coarser culm and which differs in the opaque, turgid character of the achenes, in the more elevated annulus, in the dentition of the bristles and in the thick scaly stolons.

13. E. dulcis (Burm. f.) Trin. Fig. 16. Culms terete, 4–12 dm. high, 3–5 mm. thick, with conspicuous joints at intervals of 2 to 5 cm. and numerous regular but inconspicuous false septa between the joints, from a short vertical rootstock with coarse reddish-brown roots and prominent elongated stolons: sheaths membranous, pointed at the tip, quickly disintegrating: spikelets 1.5–6 cm. long, cylindric, acute, of the same diameter as the culm: scales light-gray or straw-colored, obovate, acute or blunt, chartaceous, 4–5 mm. long, striate,

with a midrib: style 2- or 3-fid; stamens 3: achene 1.8–2 mm. long (excluding the style-base), lenticular, elliptic, brown, the surface with numerous small hexagonal cells, rarely with no reticulations, narrowed at the summit to an inconspicuous annular thickening about half the width of the achene, from which rises the dark-brown flattened style-base: bristles 6–8, exceeding the achene, light-brown, usually irregularly toothed.—Trin. ex Henschel, Vita Rumph. 186 (1833); Merrill, Interpret. Herb. Amb. 104 (1917), Enum. Phil. Pl. i. 119 (1922). *Cyperus dulcis* Rumph. Herb. Amb. vi. 7, t. 3, fig. 1 (1750). *Andropogon dulce* Burm. f. Fl. Ind. 219 (1768). *Hippuris indica* Lour. Fl. Cochinch. 16 (1790). *E. plantaginea* R. & S. Syst. ii. 150 (1817); Thw. Pl. Zeylan. 352 (1864); Boeckl. Linnaea, xxxvi. 474 (1869–1870), excl. the American plant; Hook. f. in Trimen, Fl. Ceylon, v. 68 (1900); C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 625 (1893), in Durand & Schinz, Consp. Fl. Afr. v. 600 (1895) and Ill. Cyp. t. xxxiii. figs. 1–5 (1908). *Carex tuberosa* Blanco, Fl. Filip. 35 (1837), ed. 3, i. 45, t. 15 (1877), not Degl. *Scirpus plantaginoides* Rottb. Desc. et Ic. 45, t. xv. fig. 2 (1773). *S. plantagineus* Retz. Obs. v. 14 (1789). *S. tuberosus* Roxb. Fl. Ind. (ed. Wall.) i. 213 (1820). *S. tumidus* Roxb. Fl. Ind. (ed. Wall.) i. 215 (1820). *E. tumida* R. & S. Mant. ii. 86 (1824). *E. tuberosa* R. & S. Mant. ii. 86 (1824). *S. interceptus* Roxb. acc. to Nees in Wight, Contrib. Pl. Ind. 114 (1834). *E. austro-caledonica* Vieillard, Ann. Sci. Nat. sér. 4, xvi. 38 (1862) acc. to F. Mueller, Fragm. viii. 239 (1874). *E. plantaginoidea* W. F. Wight, Contrib. U. S. Nat. Herb. ix. 267 (1905). —Southeastern Asia to Madagascar, Philippine Islands, Fiji Islands. INDIA: *Thomson;* Bengal, *Griffith; Wallich* 3454ª. CHINA: Hupeh, *A. Henry* 4247; Pekin (cult.), *Bretschneider* in 1881. JAPAN: Musashi, *Watanabe* in 1888; *Sakuraj* 48. FIJI ISLANDS: *Seemann* 698. PHILIPPINE ISLANDS: Prov. Luzon, Bulacan, *Merrill* 395.

Merrill, Interpret. Herb. Amb. 104 (1917), has discussed in detail the synonymy of this species. It is variable in height and in the septation and rigidity of the culms. The achenes show variation in the surface markings. In *Seemann* 698 (Fiji Islands) the achenes are light-brown, with small but prominent square or slightly elongated cells in 50–60 rows and with blunt scales. In *Merrill* 395 the culm is lax and the pittings on the achene are entirely absent, leaving the achene smooth except for some minute striations. A specimen (*Watanabe* in 1888) from Musashi, Japan, most nearly approaches in its hexagonal pitting and texture of the bristles Clarke's illustration of *E. plantaginea*.[1] It is possible that several entities are involved in this widely distributed species. The edible tubers are raised in large quantities in the Orient.

[1] Clarke, Ill. Cyp. t. xxxiii. figs. 1–5 (1908).

14. E. SPHACELATA R. Br. FIG. 15. Culms exceeding 7 dm. in height, septate at intervals of 1 to 5 cm. with false septa interspersed: spikelets cylindric, 2.5–4 cm. long, somewhat acute: scales obovate to broadly lanceolate, obtuse, about 1 cm. long, light-brown with a deep-brown margin or sometimes with only a dark spot at the apex, scarcely striate, occasionally with a faint nerve in the middle: style 2- or 3-fid: stamens 3: achene 2–2.5 mm. long (not including the style-base), orbicular, light-brown, biconvex, turgid, covered with minute hexagonal or quadrangular reticulations, surmounted by an annular thickening from which rises the deep-brown, flattened style-base: bristles 6–9, about 4 mm. long, much exceeding the body of the achene, light-brown, sparsely toothed.—Prod. 224 (1810); Kunth, Enum. ii. 154 (1837); Hook. f. Fl. N. Zel. i. 269 (1853) and Handb. Fl. N. Zel. 300 (1864); Boeckl. Linnaea, xxxvi. 475 (1869–1870); Mueller, Frag. viii. 239 (1874); Benth. & Muell. Fl. Austral. vii. 292 (1878); C. B. Clarke, Ill. Cyp. t. xxxiv. figs. 1–6 (1909); Cheeseman, Man. Fl. N. Z. ed. 2: 216 (1925). *Scirpus sphacelatus* Spreng. Syst. i. 204 (1825). *E. biseptata* Steud. Cyp. 82 (1855). *E. subsphacelata* Steud. Cyp. 317 (1855). *E. esculenta* Vieillard, Ann. Sci. Nat. sér. 4. xvi. 37 (1862).—Australia, Tasmania and New Zealand. The specimens represented in Gray Herbarium are AUSTRALIA: Austral. felix, *Mueller*. TASMANIA: *Gunn*. NEW ZEALAND: Takapuna, North Isl., *T. Kirk* 208.

Cheeseman (l. c.) considers *E. sphacelata* "an abundant Australian and Tasmanian plant, and very closely allied to the widely diffused *E. plantaginea* R. Br." but the characters which separate the two species are not mentioned. The reticulations are variable and are often quadrate. C. B. Clarke's illustrations (l. c.) of *E. sphacelata* and *E. plantaginea* seem almost identical. In specimens at the Gray Herbarium, *E. sphacelata* is characterized by much larger spikelets, light-brown scales edged with darker brown, and coarser achenes, often with 8 or 9 bristles. F. Meuller (l. c. 239) describes the achene of the Australian *E. plantaginea* as lightly seriate-punctulate, shining-brown, in age becoming very smooth and dark, and with very narrow bristles. *E. sphacelata*, according to Mueller, extends from the Gulf of St. Vincent and Torrens Lake through the whole of Australia (except the West) to the tropic of Capricorn. The achene is round, somewhat compressed, shining, grayish-brown, punctulate, truncate below the style. The spherical starchy tubers, often an inch long, are the most esteemed of all and serve as food for the natives, either fresh or roasted. Vieillard, Ann. Aci. Nat. sér. 4. xvi. 37 (1862), in describing *E. esculenta* (represented by no. 1456 in herb. from New Caledonia) states that the culms are septate, 40–50 cm. high; the

achenes shining-black, and the bristles 8, of unequal length. The tubers are edible. According to Vieillard, these two species, *E. esculenta* and *E. austro-caledonica,* are used by the natives of New Caledonia for making the mantles which they wear during the rainy weather and during the night. These garments, which have the form of a triangular shawl, are woven together on the side next to the body, while the exterior is covered by the ends of the culms, the long stalks overlapping one another. Merrill has included *E. esculenta* as a synonym of *E. equisetina,* but judging from the large size of *E. esculenta* in Vieillard's description, it seems to belong under *E. sphacelata.*

15. E. EQUISETINA Presl. FIG. 14. Culms terete, slender, 5–8 dm. high, 2–3.5 mm. wide, septate, from a short vertical rootstock, with coarse brownish roots: sheaths membranous, usually disintegrating: spikelets 2–4 cm. long, cylindric, acute or obtuse, usually somewhat thicker than the culm: scales 4–5 mm. long, straw-colored, orbicular, with a broad rounded, almost truncate, upper margin, striate, rigid: style 2-fid: stamens 3: achene 2–2.4 mm. long (including the style-base), lenticular, elliptical, the shining brown surface punctulate, narrowed at the base, the summit passing gradually into the flattened dark-brown style-base: bristles 6–7, light-brown, as long as the beak, with soft retrorse teeth.—Rel. Haenk. i. 195 (1828); Steud. Cyp. 82 (1855); C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 626 (1894), in Bot. Tidsk. xxiv. 85 (1901), in Phil. Journ. Sci. Bot. ii. 89 (1907); Merrill, Fl. Manila, 114 (1912), Enum. Phil. Pl. i. 120 (1922). *E. plantaginea* Vidal, Phan. Cuming .Phil. 156 (1855). *E. esculenta* Vieillard, Ann. Sc. Nat. sér. 4, xvi. 37 (1862) acc. to Merrill.—Merrill gives the range as Ceylon to Madagascar, Malaya and New Caledonia. Specimens in the Gray Herbarium are CHINA: Amoy, *Hance* 1391. PHILIPPINE ISLANDS: Manila, Kneucker (coll. *Merrill*) 224; Luzon, Prov. Sorsogon, *Elmer* 14341.

According to Presl, the plant "affinis *E. plantagineae*, differt magnitudine duplo minore, glumis magis subrotundis, stylo bifido, caryopside ancipite setarum longitudine." As represented by the specimens in the Gray Herbarium, the achenes are lenticular, not turgid, and characterized by punctulate, not reticulate, achenes.

SPECIES DOUBTFUL OR NOT SEEN

E. OBTUSETRIGONA (Lindl. & Nees) Steud. Cyp. 80 (1855). *Limnochloa obtusetrigona* Lindl. & Nees in Mart. Fl. Bras. ii.[1] 100 (1842). *E. mutata* var. *obtusetrigona* (Lindl. & Nees) Clarke in Bull. Herb. Boiss. vi. Append. 1, 20 (1898).—BRAZIL.

Steudel (l. c.) notes that Nees has taken this name from Lindley's

herbarium name, but that Nees had never seen the authentic *Salzmann* specimens upon which it was founded.

E. MITRATA (Griseb.) Clarke in Urban, Symb. Ant. ii. 62 (1909) and Ill. Cyp. t. xxxiii. figs. 10–13 (1909). *Scirpus mitratus* Griseb. Fl. Br. W. Ind. 570 (1864).—Clarke cites *Crueger* 24 from Trinidad, and includes as a synonym *E. Jelskiana* Boeckl. Linnaea, xxxviii. 376 (1874).

This species may be *E. plicarhachis* or more probably *E. fistulosa.* Grisebach describes the achene as pale, obovate-roundish, subtruncate and *produced into a tumid ring* around the tubercle, constricted at the base, biconvex, longitudinally 11–13-costate on each side, twice as long as the bristles; tubercle compressed, bluntly conical, nearly half as long as the achene, deciduous.—Based on *Crueger* 24.

E. BRASILIENSIS Boeckl. Cyp. Nov. ii. 13 (1890). "Car. juvenili oblonga obtusa *longitudinaliter striata* fusca; stylo longiusculo complanato apice bifido; perigonii setis 6, caryopsi longioribus. . . .—E vicinia H. elatae Boecklr."—In swamps near Queluz, prov. Minas Geraes, coll. *H. Schenck.*

E. ALTA Boeckl. Cyp. Nov. i. 17 (1888). The achene is not described but the plant is stated to be close to *E. variegata.*—Java, Vulcan Gede, alt. 2400 m.

According to O. Kuntze, Rev. Gen. 757 (1891) it is *Scirpus tetraquetrus* Kuntze (*E. tetraquetra* Nees).

E. NUDA Clarke, Ill. Cyp. t. xxxv. figs. 9–11 (1909).

This occurs in Australia, and is probably close to *E. philippinensis.*

E. COMPACTA R. Br. Prod. 224 (1810).

Bentham (Fl. Austral.) considers it a synonym of *E. variegata.* In the Gray Herbarium is a specimen from India (Punjab, coll. *T. Thomson*) labeled *E. compacta* Br., but this specimen, although superficially resembling members of the series *Mutatae*, clearly is not a member of it.

E. PERUVIANA Clarke, Kew Bull. Add. Ser. viii. 105 (1908) (name only).

I have not been able to find a description of this species.

E. SAGOTII Clarke, Kew Bull. Add. Ser. viii. 20 (1908).—FRENCH GUIANA.

GEOGRAPHICAL DISTRIBUTION OF SERIES MUTATAE

This series comprises about twenty species of mostly coarse perennial plants with prominent stolons, and, in the case of *E. dulcis* of the Orient and *E. sphacelata* of the Australian region, producing

conspicuous tubers which are utilized for food. The plants are always more or less immersed, varying in the mechanical structure of the culm from terete jointed types which have a superficial resemblance to species of *Equisetum*, to sharply triangular or quadrangular forms. They occur chiefly in warm temperate or subtropical regions from which they extend into the tropics and into the cooler temperate regions. The center of distribution is apparently in subtropical and warm-temperate eastern America, but three species occur in temperate North America along the Atlantic Coastal Plain and inland to the Great Lakes or the Mississippi Valley; *E. Robbinsii*, which has the greatest range, extending to Nova Scotia, Ontario and Michigan. In Florida alone there are five distinct species (*E. elongata*, *E. Robbinsii*, *E. cellulosa*, *E. equisetoides* and *E. quadrangulata*). Many are superficially alike and there has been a tendency to consider Old World and New World species as identical. However, *E. fistulosa* seems to be the only one common to both hemispheres.

EXPLANATION OF PLATE 188

(Achenes × 10)

Fig. 1, ELEOCHARIS EQUISETOIDES, Massachusetts, *Morong;* 2, E. INTERSTINCTA, Cuba, *Wright* 710; 3, E. FISTULOSA, Ceylon, *Thwaites* 3162; 4, E. QUADRANGULATA, Massachusetts, *Pl. Exsicc. Gray*, 133; 5, E. ROBBINSII, Massachusetts, *Fernald*, 16,296; 6, E. ELONGATA, Florida, *Nash* 944; 7, E. PLICARHACHIS, Cuba, *Wright*, 3372; 8, E. MUTATA, Porto Rico, *Sintenis* 4942; 9, E. PHILIPPINENSIS, Luzon, *Ramos* 1112; 10, E. VARIEGATA var. LAXIFLORA, Ceylon, *Thwaites* 3762; 11, E. CELLULOSA, Florida, *Curtiss* 6540; 12, E. SPIRALIS, Borneo, *Clemens* 9716; 13, E. FISTULOSA var. ROBUSTA, Djur, *Schweinfurth* 2326; 14, E. EQUISETINA, Philippines, *Elmer* 14,341; 15. E. SPHACELATA, New Zealand, *Kirk* 208; 16, E. DULCIS, Japan, *Watanabe.*

(To be continued.)

TWO VARIANTS OF RANUNCULUS RECURVATUS

C. A. WEATHERBY

RANUNCULUS RECURVATUS Poir., as it occurs commonly in moist woodlands and along shaded brooks, has the stem villous with spreading, mostly 2–3-celled hairs, and is described as "pubescent" by Poiret and subsequent authors. As in many other cases, however, this pubescence is variable in quantity, and Mr. E. B. Harger has called my attention to the existence of a form in which the stem is wholly glabrous, at least up to the first flower-bearing branch. It differs from the typical form in no other respect than lack of pubes-

cence and is connected with it by various intermediate stages; and, so far as the material in the Gray Herbarium shows, it has no distinctive range, but is likely to appear throughout the range of the species. It can, therefore, hardly claim systematic rank above that of forma; but since its existence quite upsets one of the key characters given for the species in current manuals, it appears to demand some recognition. With Mr. Harger's assent, it is here proposed as

Ranunculus recurvatus Poir., f. **laevicaulis** Harger, n. f., caule saltem infra ramum infimum floriferum omnino glabro.—New Hampshire: edge of rocky brook in woods, Hinsdale, June 9, 1920, *C. F. Batchelder* (herb. N. E. Bot. Club). Vermont: wet woods, Montpelier, June 5, 1913, *C. H. Knowlton* (N. E. B. C.). Massachusetts: by brook, Whately, May 17, 1913, *Fernald & Harger*, type in hb. N. E. B. C. (also a mixed sheet in Herb. Gray). Connecticut: wet woods, Salisbury, June 6, 1915, *Weatherby*, no. 3630 (herb. Weatherby). Virginia: deep, shaded ravine by stream, Williamsburg, June 10, 1920, *Grimes*, no. 2688 (Gray Herb.).

In the course of looking up the above form, it became apparent that there is in the Alleghanian region from central New York to western Virginia a rather stronger variant in which the stem and petioles bear short, closely appressed, mostly unicellular hairs. Since this plant shows a difference in type, not merely in quantity, of pubescence and seems to have a distinctive range (there is no trace of it in the abundant New England collections at Cambridge) it may stand as a variety and is here proposed as

Ranunculus recurvatus Poir., var. **adpressipilis**, n. var., caule petiolisque pilis brevibus arcte adpressis plerumque unicellularibus ornatis.—New York: open, sedgy woods, east of McLean, Groton, Tompkins Co., June 6, 1913, *Eames & MacDaniels*, no. 481. West Virginia: near Travelers' Repose, Pocahontas Co., Sept. 19, 1904, *Greenman*, no. 365. Virginia: Hungry Hollow, alt. 2200 ft., northeast of Marion, Smyth Co., May 24, 1892, *Small*, type in Gray Herb. (as are all the specimens cited).

The following key will serve to summarize the characters of the variants here discussed.

Stem with spreading, mostly 2–3-celled hairs, or glabrous.
  Stem more or less villous throughout ..... *R. recurvatus.*
  Stem completely glabrous up to the first flowering branch.... f. *laevicaulis.*
Stem and petioles with closely appressed, mostly unicellular hairs.
  var. *adpressipilis.*

Gray Herbarium.

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Farlow Bot. Lab.

RHODORA

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Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 31. September, 1929. No. 369.

THE AUTHOR OF ATHYRIUM ALPESTRE.

M. L. Fernald.

There has been great confusion as to the authorship of the combination, *Athyrium alpestre*. In the folio edition of his *Ferns of Great Britain and Ireland* (1857), Thomas Moore, treating the plant as *Polypodium alpestre* (t. vii), cited the synonym "Athyrium alpestre, *Rylands, in litt.*"; and some subsequent authors, Christensen, *Index Filicum*, fasc. iii. 139 (1905), Butters, Rhodora, xix. 203 (1917) and Fernald, Rhodora, xxx. 48 (1928) have *correctly* used the combination, *A. alpestre* (Hoppe) Rylands. Some others, however, have written *A. alpestre* (Hoppe) Nylander; such authors as Milde, *Filices Europae et Atlant.* 53 (1867) who called it *A. alpestre* "*Nyland.* teste *Moore*," Nyman, *Conspectus*, 864 (1883), Holmberg, *Skandinaviens Flora*, i. 19 (1922) and Becherer, Bericht. d. Schweizer. Bot. Gesellsch. xxxvii. 145 (1928).

When we go to Milde we find the reference for the combination carried back to Moore ("teste *Moore*"); and, singularly enough, Moore, himself, in all his works subsequent to his publication of "Athyrium alpestre, *Rylands, in litt.*" ascribed the combination to Nylander! The preface to the folio work was dated March 20, 1855, and the copy in the library of the Gray Herbarium was received in Cambridge on November 11, 1857. Yet, in Moore's *Handbook of British Ferns*, ed. 3 (1857), the preface of which was dated August 31, 1857, indicating publication later than the folio work, Moore gives "Athyrium alpestre, Nylander" (p. 59); again, in his *Nature Printed British Ferns* (octavo), i. 76 (1859) Moore gives *A. alpestre* Nylander, this time "according to Ledebour"; and shortly after

(February, 1860) in *Index Filicum*, Moore again ascribed the name to Nylander.

Moore's reason for thus changing the author from Rylands to Nylander was apparently his belief that Nylander had antedated Rylands; but, following out the clue given by Moore's "*Nylander;* according to Ledebour," we find Ledebour, *Flora Rossica*, iv. 510 (1852–53), making the note under *Polypodium rhaeticum* (= *Aspidium alpestre* Hoppe): "Species quoad genus dubia, e sententia cl. F. NYLANDER A t h y r i i s associanda." But, so far as I am able to find, Nylander did not actually publish the combination and its first semi-valid publication (in synonymy only) was when Moore ascribed it to Rylands. Not only did Moore give Rylands as the author; he quoted a convincing letter from Rylands upon the subject: "Mr. Rylands, of Warrington, who regards the plant as an *Athyrium*, has communicated the result of some observations made in 1855 . . . , from which the following passages are quoted:— '. . . that it has the true indusium of an Athyrium I think cannot be further disputed.'"

It should be clear, then, that RYLANDS, as originally used by Moore, was not a misprint for Nylander, as some have inferred, and that Nylander actually did not make the combination *Athyrium alpestre* ascribed to him. Thomas G. Rylands was a microscopist living at Warrington and he published various papers on microscopy, including one in 1844 on the nature of substances found on the roots of *Monotropa Hypotitys*, another (in 1855) on snow crystals observed at Warrington, and another (in 1860) on the markings of *Diatomaceae*. His detailed letters quoted by Moore show that he was an accurate student of the ferns. He should stand as the undisputed author of *Athyrium alpestre*.

GRAY HERBARIUM.

NOTES ON THE FLORA OF SWANTON, VERMONT.—It has been my custom for many years to spend my vacation at my old home and birthplace at Swanton, Vermont, and to roam again the beautiful fields, pastures and woodlands where I spent my boyhood days. During the all too brief period of an August vacation, it has been a great pleasure to list the plants of my native place; and it was an added pleasure the past year to add a new plant to the Vermont state list.

While visiting a friend near Lake Champlain I had the opportunity to explore a marshy region where Charcoal Creek empties into Missisquoi Bay, also the drier, gravelly fields near by and the shore along the Bay. On the drier gravel in a pasture I found a tiny plant that I recognized as a species of *Euphrasia*. I sent the specimen to the Gray Herbarium, where it was identified as *Euphrasia stricta* Host.

All about in this pasture, in full bloom, was *Gerardia paupercula*. In the swamps and wetter places and along the wet strand of the beach the ground was almost yellow with the blossoms of *Gratiola aurea;* and along the gravelly and rocky shore the tiny *Ranunculus Flammula*, var. *reptans* grew in abundance. On the drier shore was *Polanisia graveolens* in some quantity, also *Artemisia caudata;* and in the shallow water of the Bay was a miniature forest of the Giant Bulrush, *Scirpus occidentalis*.—Arthur E. Blewitt, Waterbury, Connecticut.

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS

H. K. Svenson

(*continued from page 162*)

Series Pauciflorae

(Plate 189)

a. Scales pale or, if dark, with the culms at least 1.5 dm. high and the achenes 2–3 mm. long....*b*.
  b. Scales light-brown or stramineous to chocolate-brown; culms 1.5 dm. or more in height; achenes 2–3 mm. long....*c*.
    c. Culms coarse, compressed, 1–2 mm. wide....*d*.
      d. Spikelets 9–20 mm. long, 12–20-flowered; culms often rooting at tip.....18. *E. rostellata.*
      d. Spikelets 5–9 mm. long, 9–12-flowered
17. *E. pauciflora* var. *Suksdorfiana.*
    c. Culms slender, scarcely compressed, less than 1 mm. in diameter....*e*.
      e. Beak of achene 1 mm. long; spikelets broadly ovate.20. *E. macrantha.*
      e. Beak of achene not exceeding 0.5 mm.; spikelets ovate....*f*.
        f. Rhizomes not forming a dense indurated turf..17. *E. pauciflora.*
        f. Rhizomes forming a dense indurated turf; culms glaucous and arching.....17. *E. pauciflora* var. *bernardina.*
  b. Scales usually green, often with brown sides; plants always dwarf, 2–5 (rarely –7) cm. high; achenes 1–1.5 mm. long....*g*.
    g. Achenes sharply triangular, smooth and shiny; bristles equaling the achene.....16. *E. parvula.*
    g. Achenes with blunt outer angle, minutely verrucose, dull; bristles lacking.....19. *E. leptos.*
a. Scales dark, reddish-brown to black; culms 2–15 cm. high; achenes 1–1.5 mm. long (Andean species)....*h*.

h. Spikelets 8–15-flowered; achenes 1 mm. long, golden-yellow; style-base as wide as the achene.....24. *E. Brehmeriana.*
h. Spikelets 3–8-flowered; achenes 1.5 mm. long....*i*.
i. Scales black; style-base as broad as the apex of the achene.....21. *E. albibracteata.*
i. Scales brown; style-base narrower than the apex of the achene, a whitened ridge present at the junction with the body of the achene....*j*.
j. Culms 9–14 cm. long; spikelets 3–5 mm. long; outer angle of achene acute.....22. *E. boliviana.*
j. Culms 1–8 cm. long; spikelets 2.5–3 mm. long; outer angle of achene blunt.....23. *E. nubigena.*

16. E. PARVULA (R. & S.) Link. FIG. 18. Forming mats: roots fibrous, often with minute tuberous stolons: culms capillary (2–7 cm. high), greenish or straw-colored, often spongy and translucent, terete, becoming somewhat striate in drying: upper sheath inconspicuous, membranous; spikelets 2–3.5 mm. long, broadly ovate, 2–9-flowered: scales ovate, scarcely keeled, obtuse or acute, striate and chartaceous, green to yellowish, often dull-brown on the sides; lowest scale empty, half the length of the spikelet: stamens 3: style 3-fid: achenes obovate, 1–1.4 mm. long, straw-colored, equilaterally triangular with prominent angles, smooth and shining, under high magnification sometimes lightly striate-reticulate: style-base very small, triangular, greenish: bristles straw-colored, equaling or exceeding the achene.—Link ex Bluff, Nees & Schauer in Bluff & Fingerhuth, Comp. Fl. Germ. ed. 2. i. part i. 93 (1836);[1] Hook. Brit. Fl. ed. 5. 418 (1842); Palla in Engler, Bot. Jahrb. x. 299 (1889) and in Koch, Syn. ed. 3, iii. 2542 (1907); Hegi, Ill. Fl. Mitteleur. ii. 41, fig. 198 (? 1909). *Scirpus pusillus* Vahl. Enum. ii. 246 (1805); Pursh, Fl. Am. Sept. i. 54 (1816); Torr. Fl. N. Mid. St. i. 46 (1824). *S. fluitans* Spreng. Mant. i. 4 (1807), not L. *S. nanus* Spreng. Pugill. i. 4 (1813); Wallr. Annus Botanicus (Fl. Hal. Suppl. iii.) 7 (1815); Robinson & Fernald in Gray, Man. ed. 7. 189 (1908); not Poir. *S. pollicaris* Del. Fl. Egypte Ill. 50. t. 63, fig. 10 (1813).[2] *S. capillaceus* Ell. Sk. Fl. S.

[1] This is unquestionably the first publication and refers to *Eleogiton parvula* Link, Hort. Berol. i. 285 (1827) with full synonymy. Sprague, Kew Bull. 1920: 72–74 (1920), has compiled a list of the plants published in Bluff & Fingerhuth, Comp. Fl. Germ. ed. 2, overlooked by the Index Kewensis, but *Eleocharis parvula* does not occur in this list.

[2] Pritzel lists only 62 plates. Of the two copies at the Gray Herbarium, one has 62 plates, the other 64 plates. No description accompanies the name in the text, nor is there any reference to the figure, which is in a separate volume, without date. The figure, however, is an excellent one, clearly the species which we are describing, and is accompanied by the name, *Scirpus pollicaris*. Since the text name is a *nomen nudum*, the date of publication of *S. pollicaris* is the date of issue of the plate. Plates 63 and 64 are marked in the upper left hand corner "Flore d'Egypte par M. Delisle (Supplément)," and they were unquestionably completed subsequent to 1813 and probably later than 1817, the date of publication of *Scirpus parvulus*. Monographers who have dealt with plants figured on these plates (there are 34 excellent figures) have invariably omitted the date of issue. The only references which I have been able to obtain are the three following:

(1) Hackel, Flora, lxiii. 475 (1880). Hackel states that the supplementary plates

Car. i. 75 (1816), not Michx. *S. parvulus* R. & S. Syst. ii. 124 (1817); Reichb. Ic. Fl. Germ. viii. fig. 706 (1846); Anderss. Cyp. Skand. 9, t. 1, fig. 20 (1849); Meinshausen, Acta Hort. Petrop. xviii. 258 (1901); Aschers. & Graebn. Syn. ii.[2] 297 (1904); Rouy, Fl. France, xiii. 385 (1912); Birger, Sv. Bot. Tidsk. vi. 608–618, 1 map (1912); Blomgren in Holmberg, Skand. Fl. 310 (1926). *S. humilis* Wallr. Sched. Crit. 27 (1822). *Eleogiton parvula* Link. Hort. Berol. i. 285 (1827). *Limnochloa parvula* Reichb. in Moessl. Handb. ed. 2, iii. 1808 (1829) and Fl. Germ. Excurs. 78 (1830). *Bacothryon nanum* A. Dietr. Sp. Pl. ii. 91 (1833). *B. pusillum* A. Dietr. Sp. Pl. ii. 92 (1833). *Eleocharis pygmaea* Torr. Ann. Lyc. N. Y. iii. 313 (1836). *S. translucens* Legall in Lloyd, Fl. Loire Inf. 275 (1844). *Chaetocyperus pygmaea* Walpers, Ann. iii. 683 (1852–1853), wrongly ascribed to Torrey. *Cyperus parvulus* Missbach & Kraus in Sturm, Fl. Deutsch. ed. 2, ii. 26, t. 7 (1900).—Salt marshes and brackish mud or sand along the seacoast, rare inland in salt lakes, Newfoundland to Louisiana and the West Indies, inland in New York, Michigan, and Minnesota (?), and on the Pacific coast from northern California to Washington and British Columbia;[1] Atlantic coast of Europe north to Norway, and on the Mediterranean coast of Europe and North Africa. Also at Rio de Janeiro, Brazil. Reported by Ascherson and Graebner (l. c.) from South Africa and Japan. The record from South Africa is undoubtedly based on Sprengel, Syst. 205 (1825) "Sc. parvulus R. et Sch. e. *C. B. S.* simillimum habeo" and has not been substantiated. I do not know the source of the report from Japan. The following, from the numerous specimens examined, are cited as typical. NEWFOUNDLAND: Norris Arm, *Fernald & Wiegand*, 755; Stephenville, *Fernald & Wiegand* 2709; Burgeo, *Fernald, Long & Fogg* 111. QUEBEC:[2] Cap à l'Aigle, *Macoun* 69303. NEW BRUNSWICK: Miscou Island, *Blake* 5580; Bathurst, *Fernald & Williams* in 1902; Fairville, *Fernald, Long & Fogg* 112. NOVA SCOTIA: Cape Breton, *Nichols* 1252; Sable Island, *St. John* 1156, *Macoun* 22649; Bridgewater, *Fernald & Long* 23384; Argyle Head,

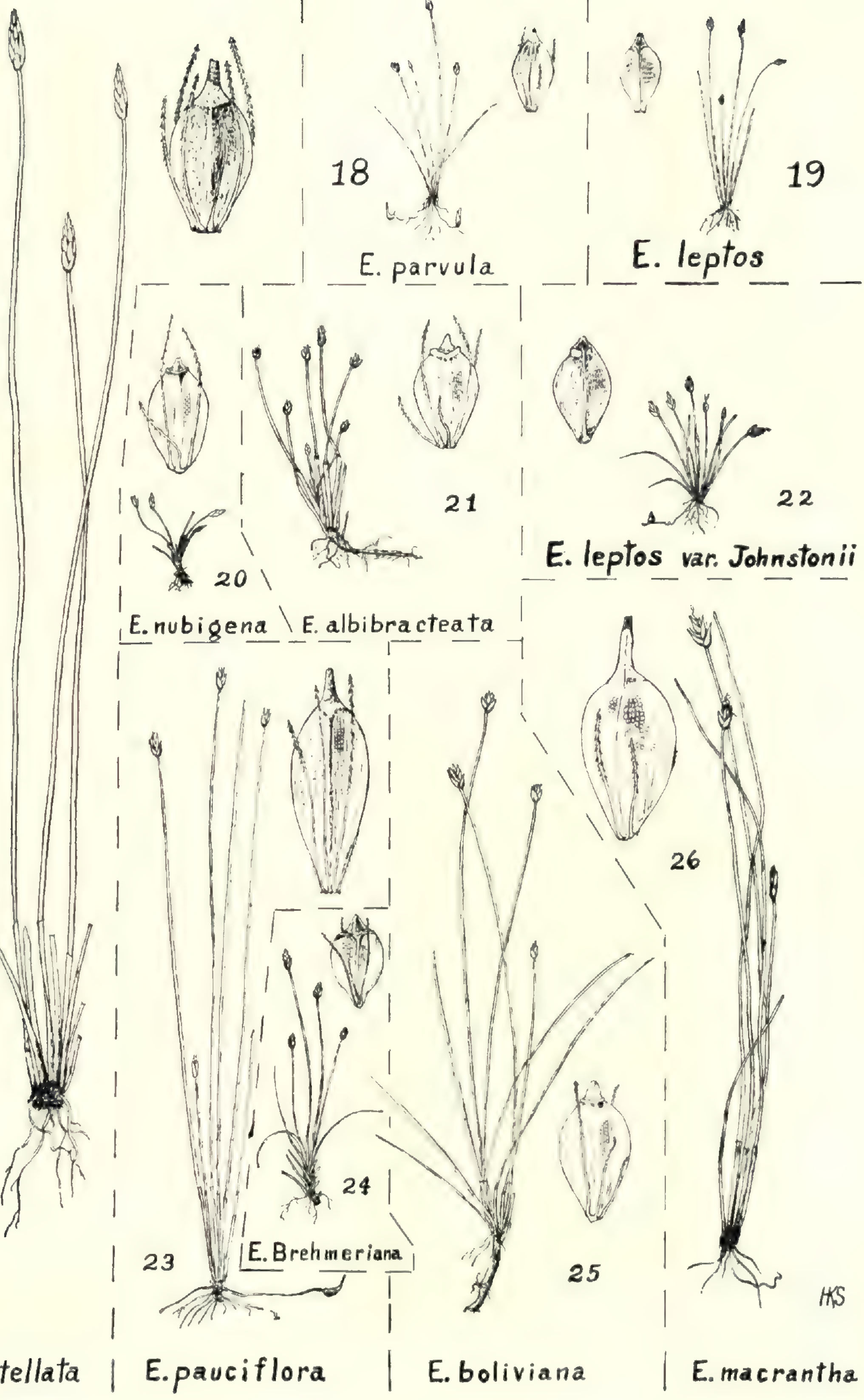
"Keine Publizität erlangte," and that according to a letter from Ascherson only two examples of these plates exist, one at Montpellier, the other at Paris. (2) Plates 63 and 64 were reproduced, although much reduced in size, by C. & W. Barbey, *Herborisations au Levant*, t. 8 (1882). This reproduction was made by photography from the Montpellier plates. Since 1882 is the date of publication of Barbey's plates, it becomes the date of publication of *Scirpus pollicaris* and other Delile species figured therein. (3) Junk, *Bibliographia Botanica*, 215 (1909) states that in 1895 eleven examples of plates 63 and 64 were sold at auction by Porquet in Paris. This may be the source of plates which I have seen at the Gray Herbarium, Arnold Arboretum, and New York Botanic Garden.

[1] I have seen no specimens from the interior except from New York and Michigan. Reports from the interior of California are based upon *E. Lindheimeri* (Cucamonga, *Bigelow* in 1854) or upon *E. leptos* var. *Johnstonii* (San Bernardino Mts.). See note by P. A. Munz, Bull. So. Calif. Acad. Sci. xxiv. 47 (1925).

[2] *Svenson & Fasset* 980 from Riv. du Loup, Quebec, and 978, 981 and 982 from New Brunswick, issued as *Scirpus nanus* are all diminutive and sterile *Sagittaria graminea*.

Fernald & Long 23385; Weymouth, *Fernald et al* 20171. MAINE: Perry, *Fernald* 1394; Bar Harbor, *Knight* 5307; Wells Beach, *Fernald* in 1898. NEW HAMPSHIRE: Hampton, *E. F. Williams* in 1911. MASSACHUSETTS: Nahant, *Boott;* Barnstable, *Fernald & Long* 18040; Hyannisport, *Greenman* 369; Marthas Vineyard, *Seymour* 1101. RHODE ISLAND: Middletown, *E. F. Williams* in 1909. CONNECTICUT: Stratford, *Harger* in 1900. NEW YORK: Staten Island, *Britton* in 1889; Cayuga Co., Howland Island, *Wiegand, Randolph & Eames* 11437; Onondaga Lake, *Rowlee & H. H. Smith* in 1906. NEW JERSEY: *Green* in 1834; Cape May, *Gershoy* 151. VIRGINIA: York River, *Grimes* 4022. GEORGIA: Tybee Island, Chatham Co., *Harper* 2176. FLORIDA: Titusville, *Nash* 2311; *Chapman* (as *E. pusilla*). MICHIGAN: deer lick near Hubbardston, Ionia Co., *C. F. Wheeler* in 1887 (N. Y.). MISSISSIPPI: Ocean Springs, *S. M. Tracy* 110 (N. Y.); Ship Island, *S. M. Tracy* 5334 (N. Y.). LOUISIANA: La Plaquanim Parish, *A. B. Langlois* in 1884 (N. Y.). CALIFORNIA: Stone Lagoon, Humboldt Co., *J. P. Tracy* 6744 (P.) WASHINGTON: Westport, *J. M. Grant* in 1918 (as *E. acicularis*). BRITISH COLUMBIA: Barclay Sound, Vancouver Island, *J. Macoun* 42 (N. Y.). CUBA: Havana, *Ekman* 767; *Rugel* 905 (without locality). BRAZIL: Rio de Janeiro, *C. Ule* 14356 (U. S.).

Noted originally from the vicinity of Halle, Germany, by Sprengel (1807) who identified it with *Scirpus fluitans* L., but later (1813) published it as *Scirpus nanus*. Wallroth presented an excellent diagnosis of the plant (1805), but in 1822, because of a pre-existing *Scirpus nanus* (Poir. Encyc. vi. 759 (1804) = *Fimbristylis argentea*), described it as *Scirpus humilis*. Due to an existing *Eleocharis nana* Kunth, Enum. ii. 140 (1837), a South American plant, the name *Eleocharis parvula*, originating from *Scirpus parvulus* Roemer & Schultes (1817) and in current usage in Europe, should be maintained. Vahl (1805) described *Scirpus pusillus* from America, based to some extent upon *Scirpus capillaceus* of Michaux (which has since been identified as *Eleocharis acicularis*), but with "culmis teretis" and the achene "acute trigonum" and in the Gray Herbarium is a Beyrich specimen from southern United States labeled "*Scirpus pusillus* Vahl!" This specimen is clearly *Eleocharis parvula*. However, since the name, *Eleocharis pusilla*, was taken up by Robert Brown, Prodr. 225 (1810), it does not become available for use here, whatever may be the status of Vahl's material. Elliott in the *Sketch of the Botany of South Carolina* (1816), p. 75, describes the achenes of *Scirpus capillaceus* as "compresso obovato." I have not had the opportunity of seeing the Elliott herbarium, which is at Charleston,



H K. Svenson del.

ELEOCHARIS, SERIES PAUCIFLORAE

(Habit-drawings × ½; achenes × 15, except fig. 17, × 10)

South Carolina, but the plant described is probably not *Eleocharis parvula*.

The map published by Birger (l. c.) shows in detail the distribution of this species in northern Europe. Confusion in identification has been largely with *E. acicularis* and especially with *E. acicularis* var. *submersa*, but the recognition of *E. parvula* is not difficult if the tubers are present. Glück, Untersuch. ueber Wasser-und Sumpfgewächse, iii. 577 (1911), discusses the culture of this plant, which he was able to grow in fresh water; and *Scirpus parvulus* forma *submersus* Glück, which is always sterile, is described and figured by him (l. c. fig. 104).

17. E. PAUCIFLORA (Lightf.) Link. FIG. 23. Erect, from creeping rootstocks; the stolons often with conspicuously thickened buds: culms slender, 1.5–4 dm. high, striate: sheath 2–3 cm. long, straw-colored or brownish, truncate: spikelets 4–7 mm. long, ovate, 2–7-flowered: scales all flower-bearing, chocolate-brown with pale scarious margins and tip; the two lower larger: stamens 3; the filaments often whitened and elongated: style trifid: achenes obovoid or fusiform, 2–3 mm. long, in cross-section triangular or plano-convex, prominently reticulate with small rectangular cells; the triangular or lanceolate beak tipped by the dark style: bristles slender, irregularly toothed, equalling or exceeding the achene, sometimes poorly developed.—Hort. Berol. i. 284 (1827); Hegi, Ill. Fl. Mitteleur. ii. 40. t. 43, fig. 5 (? 1909). *Scirpus pauciflorus* Lightf. Fl. Scot. ii. 1078 (1777); Hornem. Fl. Dan. xi. fasc. xxxii. 3, t. mdcccclxii. (1827); Reichb. Ic. Fl. Germ. viii. 38, figs. 707, 708 (1846); Anderss. Cyp. Skand. 9, t. 1. fig. 21 (1849); C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 654 (1893) and in Engler, Bot. Jahrb. xxx. Beibl. 68: 26 (1901); Aschers. and Graebn. Syn. ii.[2] 296 (1904); Jepson, Fl. Cal. pt. vi. 199, fig. 18 (1922); Blomgren in Holmberg, Skand. Fl. 311 (1926). *S. Baeothryon* L. f. Suppl. 103 (1781);[1] Vahl Enum. ii. 244 (1805). *S. sepium* Honck. Verz. All. Gew. Teutsch. i. 78 (1782). *S. Halleri* Vill. Plant. Dauph. ii. 188 (1787). *S. quinqueflorus* Vitm. Summa Pl. i. 150 (1789). *S. campestris* Roth in Usteri, Ann. Bot. xiv. 18 (1795).[2] *E. Baeothryon*

[1] The specific name *Baeothryon* was founded upon one of the "nomina usualia" of Ehrhart, Linnaeus f. citing "Baeothryon. *Ehrh. phytoph. n. 31.*" The *Phytophylacii* were sets of exsiccatae which Ehrhart issued in 1780 and later. Their names were published in the "Index Phytophylacii Ehrhartiani" in 10 decades, in Ehrhart's Beitraege, iv. 147 (1789). In an autobiographical sketch Ehrhart mentions both the Linnean Supplement and the Phytophylacii (Usteri, Ann. Bot. xix. 5 (1796)). The "decades" were accompanied by the "nomina usualia," which were never intended for scientific use. However, Farwell and also House have taken up one of these names *Trichophyllum* as antedating *Eleocharis*. For a discussion of Ehrhart's names see Barnhart, RHODORA, xxii. 180–182 (1920), and Fernald, RHODORA, xxix. 226 (1927).

[2] Moessler, Handb. 91 (1833) refers to *Scirpus Baeothryon*, α *major* Dreves & Hayne, Choix Pl. Eur. iv. t. 94 (1802) and β *minor* (*S. campestris* Roth, Dreves & Hayne, l.c

Presl. Fl. Čech. 11 (1819).[1] *Limnochloa Baeothryon* Reichenb. in Moessl. Handb. ed. 2, iii. 1808 (1829) and Fl. Germ. Excurs. 78 (1830). *Clavula Baeotryon* Dum. Fl. Belg. 143 (1827). *Baeothryon pauciflorum* A. Dietr. Sp. Pl. ii. 90 (1833). *Baeothryon Halleri* T. F. Nees, Gen. Germ. Ic. ii. 17 (1843). *E. atacamensis* Philippi, Fl. Atacam. 53 (1860); Boeckl. Linnaea, xxxvi. 454 (1869–1870); Philippi, Anal. Univ. Chil. v. 93 (1896); Barros, Anal. Mus. Nat. Hist. Buenos Aires, xxxiv. 486, fig. 31 (1928). *S. andinus* Philippi, Anal. Univ. Chil. (1873) 554. *Cyperus pauciflorus* Missbach & Krause in Sturm, Fl. Deutsch. ed. 2, ii. 27, t. 7. (1900).—Wet calcareous soil, Newfoundland and Quebec to northern New England, New York, Indiana and Illinois. Also in western United States and western Canada, especially at high altitudes. Europe, Asia and South America. From many North American specimens the following are cited. Newfoundland: Straits of Belle Isle, Eddies Cove Brook, *Fernald, Wiegand & Long* 27524; Flower Cove, *Fernald et al* 26328; Bonne Bay, *Fernald & Wiegand* 2712; Bay of Islands, *Mackenzie & Griscom* 10116; Grand Falls, *Fernald & Wiegand* 4757. Quebec: Anticosti, *Victorin & Germain* 25779; Magdalen Islands, Grindstone Island, *Fernald et al* 6964; Gaspé Co., Madeleine R., *Fernald, Dodge & Smith* 25497; L'Islet, *Victorin* 3074; Bonaventure Co., New Richmond, *Fernald & Williams* in 1902. New Brunswick: Victoria Co., Gorge of Aroostook River, *Fernald* 1395. Nova Scotia: Baddeck Bay, *Fernald & Long* 20180. Maine: Fort Fairfield, *Fernald & Robinson*, Pl. Exs. Gray. 3; Monticello, *Fernald & Long* 12822; Sangerville, *Fernald* 246. New Hampshire: Stewartstown, *Moore* 3962. Vermont: Willoughby Mountain, *Tuckerman* in 1859, *Boott* in 1863. New York: Herkimer County, State Marsh, *Haberer* 1154; Tioga County, Spencer Lake, *Eames & Wiegand* 11438; Cayuga County, Springport, *Eames & Wiegand* 9347; Sodus Point, *Henderson* in 1874; Watertown, *Crawe*. Pennsylvania: Presque Isle, *Garber* in 1869. Ontario: Galt, *Herriot* 1; Pt. Colburne, *Macoun* 34565; Point Edward, *Macoun* 34566; Lake Nipigon, *Macoun* in 1884. Indiana: Lagrange, *Deam* 36640A. Illinois: Ringwood, *Vasey* in 1860–1861. Michigan: Saginaw Bay, *C. K. Dodge* 16; Charlevoix, *Wheeler* in 1892; Sault Ste. Marie, *Churchill* in 1910. Wisconsin: Door Co.,

t. 95). These plates represent *Scirpus Baeothryon* and *Scirpus campestris*, respectively. According to Dreves & Hayne *S. campestris* is differentiated by (1) smaller size, (2) by the sterile culms which are shorter than the fertile, (3) by the linear spike during flowering, (4) the scales of uniform length, (5) 3 or 4 flowers in a head, etc. From their excellent presentation it appears that *S. campestris* is merely a dwarf state of *E. pauciflorus*.

[1] This combination was incorrectly referred by Presl to Roemer & Schultes, who, Enum. ii. 123 (1817), published *Scirpus Baeothryon*. *Eleocharis Baeothryon* Schultes, Mant. ii. 92 (1824) refers to *Scirpus* no. 6 of Muhlenberg, Desc. Gram. 29 (1817), habitat in New York and "*S. Baeothryo* affinis." It is impossible to identify this plant, although indications point to either *E. pauciflora* or *E. rostellata*. Asa Gray was unable to identify it in the Muhlenberg Herbarium. Torrey Ann. Lyc. N.Y. 315 (1836), through error, cites *Scirpus* no. 7, thereby identifying it with *S. tuberculosus* Michx.

Rowley's Bay, *Pease* 18000. SASKATCHEWAN: Bredenberg, *Herriot* 73106; Cypress Hills, *Macoun* 294 and 298. [NORTH?] DAKOTA: *Leiberg* 1947. ALBERTA: Banff, *Butters & Rosendahl* 1329; Lake Louise, *Macoun* 64180. MONTANA: Monida, *M. E. Jones* 9384 (P). WYOMING: Fort Bridger, *Porter* in 1863; Yellowstone Park, *A. Nelson* 6159; North Park, *Osterhout* in 1896. COLORADO: Sangre de Christo Mts., *Hicks* 82; Ruxton Dell, *Clements* 350; Empire, *Patterson* in 1892; Seven Lakes, *Clements* 479. UTAH: Salt Lake Co., Big Cottonwood Canyon, *Garrett* 1960. BRITISH COLUMBIA: Laggan, *Wheeler* 1057; Glacier Park, *Fogg* 1179. WASHINGTON: Douglas Co., *Leiberg & Sandberg* 416. OREGON: Des Chutes River, *Peck* 9706; Upper Klamath Lake, *Peck* 9494; Crook Co., *Leiberg* 225; Mt. Jefferson, *J. C. Nelson* 2852; Imnaha River, *Cusick* 3127. CALIFORNIA: Soda Springs, *M. E. Jones* in 1881 (P); Summit, Nevada Co., *M. E. Jones* in 1902 (P); Shepherd's Canyon, *M. E. Jones* in 1897 (P); Yosemite Valley, *Bolander* 6236; Desolation Valley, *Smiley* 334; Round Valley, San Jacinto Mts., alt. 8900 ft., *Munz* 6050 (P); Bluff Lake, San Bernardino Mts., alt. 7400 ft., *Munz* 10683 (P). The following specimens have been seen from South America: CHILE: Prov. Nuble, Banos de Chillan, *Werderman* 1297; Prov. Atamaca, Dept. Copiapo, *Werderman* 966; vic. of Porterillos, Dept. Chañaral, *I. M. Johnston* 4711.[1]

Blomgren (l. c.) reports *Eleocharis pauciflora* from Sweden in bogs, wet meadows (especially meadows by the seashore) or moist pastures and roadsides; for the most part on calcareous ground, ascending the lower mountains. In northeastern United States the plant is rare, occurring almost entirely on marl bogs or on wet calcareous ledges.

Although known in Europe from early times it was first adequately described by Lightfoot from the Scottish highlands. It has served as the type of the genus *Baeothryon* of several authors. The achenes vary greatly in length and diameter of the beak, the degree of reticulation and the prominence of the angles. Watson, Bot. Calif. ii. 221 (1880) noted that "The species has usually been included under *Scirpus*, but there appears to be no good reason for separating it from *Eleocharis*, inasmuch as it has all of the characters which distinguish that genus from *Scirpus*. The tubercle is identical in character with that of *E. rostellata* and its allies, and such as is not found in *Scirpus*, where the style is slender and never tubercle-like at base." The tubercle appears distinct in both color and

[1] Specimens collected by Dr. Johnston in Chile were compared by him with the type of *E. atacamensis* in the Philippi herbarium and are the same in height and in form, size, surface and bristles of the achene. I am unable to separate these specimens from *E. pauciflora*.

texture from the body of the achene and the style itself, and a thorough examination of the species of *Scirpus* which might be considered close to this species, has convinced me that *E. pauciflora*s and its allies stand clearly apart from *Scirpus*.

Var. **Suksdorfiana** (Beauverd), n. comb. Erect from a short caudex: culms 2–3 dm. tall, wiry, compressed and conspicuously sulcate, 1 mm. wide: spikelets 5–9 mm. long, 9–12-flowered: achenes as in *E. pauciflorus*.—*E. Suksdorfiana* Beauverd, Bull. Soc. Bot. Genève. sér. 2, xiii. 267 (1922).—In boggy mountain meadows, Washington and Oregon. WASHINGTON: Skamania Co., *Suksdorf* 2237 (TYPE COLL.); Falcon Valley, *Suksdorf* 2537 and 2820; Mt. Adams, *Suksdorf* 90 in 1882 (as *S. pauciflorus*). OREGON: Burns, Harney Co., *L. F. Henderson* 8663, in part. (Herb. Univ. Oregon).[1]

This plant was distributed as a questionable *Eleocharis rostellata* (which it greatly resembles in height, coarseness, and short, thickened rootstock), but was clearly separated by Beauverd from *E. rostellata* by its purple, fibrous roots, variation of spirals in the inflorescence, non-persistent scales, and the number of flowers in a spikelet. However, the short spikelets, purplish roots, the conspicuously reticulated and elongated achenes, and the long slender bristles, show that the affinity of this plant is with *E. pauciflora*. Transitional specimens such as *A. Nelson*, Wyoming in 1902 make it best to treat the plant as a variety of *E. pauciflora*.

Var. **bernardina** (Munz & Johnston), n. comb. According to the original description, it differs from *E. pauciflora* "in its spreading recurved stems, densely caespitose turf-forming habit, and smaller, smoother and less sharply-angled achenes. It grows in the Canadian zone of the San Bernardino Mountains where the frequent colonies are conspicuous because of their gray-green color, low dense growth and sharply defined limits."—*Scirpus bernardinus* Munz & Johnston, Bull. Torr. Bot. Club, lii. 221 (1925).—CALIFORNIA: San Bernardino Co., south fork of Santa Ana River, 8500 ft. (2600 m.), *Munz* 6187 (TYPE in Pomona College Herb.); south fork of Santa Ana River, 8200 ft. (2500 m.), *Hall* 7608; south fork of Santa Ana River, 7600 ft. (2300 m.) *Munz* 10804 (G, P); Pinos, Santa Barbara, *R. Hoffmann* in 1927 (P.).

I think this plant should be regarded as a variety of *Eleocharis pauciflora*. The specimen, *Munz* 10804, in the Gray Herbarium, has achenes somewhat smaller than is usual in the species, but the spikelets do not seem to have been well developed. *Munz* 10683, from the

[1] This specimen was loaned to me by Dr. M. E. Peck. The label carries the notation "has little bulbs of which the white geese seem very fond."

San Bernardino Mountains, distributed as *Scirpus pauciflorus*, has achenes which vary greatly from the normal in being shorter, with a less-extended beak, with prominent almost costulate angles and a peculiar varnished surface. It shows the glaucous coloration and the thickened rootstocks of 10804, but has the upright habit and thickened buds so characteristic of *Eleocharis pauciflora*. I am inclined to treat this plant also as var. *bernardina*, laying stress on the thickened rootstocks, glaucous wiry culms and the short (2 mm. long) achene with the very prominent angles. From this point of view, it may perhaps be considered as a distinct species, but some of the specimens of *Eleocharis pauciflora* collected in the mountains of Colorado, namely *Clokey* 3424 and *Clements* 479 and 350, also have hardened bases and glaucous culms and therefore approach the var. *bernardina*, so that it is difficult to decide definitely the status of the plant. Recently I have received additional material from Dr. Munz. His no. 10804 in the herbarium of Pomona College is abundantly fruiting and the achenes vary from obtusely triangular to biconvex.

18. E. ROSTELLATA Torr. FIG. 17. Erect or arching from a short vertical rootstock; roots thickened, whitish: culms wiry, conspicuously flattened and sulcate 2.5–15(–22) dm. in length, 1–2 mm. wide, often reclining and rooting from the apex: sheaths rigid, truncate or oblique: spikelet spindle-shaped, acute, 12–20-flowered, 8–20 mm. long: scales light-brown, rigid, ovate, the uppermost becoming acute: stamens 3; the filaments often elongated and whitened: style 3-fid: achene obovoid, obtusely triangular or plano-convex, olive, shiny, under magnification lightly reticulate, 2–3 mm. long, narrowed into the obtuse light-green beaked style-base, which is about one-third the length of the achene: bristles firm, regularly toothed, light-brown, equalling the achene.—Fl. N. Y. ii. 347 (1843); Robinson & Fernald in Gray Man. ed. 7: 185, fig. 263 (1908). *E. rostellata* var. *occidentalis* Wats. Bot. Cal. ii. 222 (1880). *E. rostellata* var. *Congdoni* Jepson, Fl. Cal. 196 (1922). *Scirpus rostellatus* Torr. Ann. Lyc. N. Y. iii. 318 (1836).—Salt marshes, Nova Scotia to Florida; rare inland about salt springs and in calcareous bogs in the eastern United States, becoming common in the alkaline regions of the West. Also in Bermuda, Cuba and Mexico. From many specimes the following are cited. NOVA SCOTIA: Yarmouth Co., Sand Beach, *Fernald et al.* 20165; Tusket, *Fernald et al.* 20167; Argyle Head, *Fernald et al.* 23383; Central Chebogue, *Pease & Linder* 20166. MASSACHUSETTS: Medford, *Boott* in 1865; Harwich, *Fernald* 16332; Edgartown, *Seymour* 1606. RHODE ISLAND: Providence, *Olney*. CONNECTICUT: New Haven, *Harger* in 1887. NEW YORK: Conquest, *Wiegand*

5919; Junius, *Wiegand* 1770, *Sartwell;* Penn Yan, *Sartwell;* Bergen Swamp, *Clinton* in 1865, *House* 6529. NEW JERSEY: Hackensack Marshes, *T. F. Allen* in 1863; Atlantic City, *Parker* in 1871. DELAWARE: Appoquinimink, *Commons* in 1866. VIRGINIA: Williamsburg *E. J. Grimes* 2660. FLORIDA: Miami, *Garber* in 1877. ONTARIO: Courtland, *Macoun* 34488; Galt, *Herriot* 39. MICHIGAN: Hubbardston, *Wheeler* in 1890. INDIANA: Houghton Lake, 2 mi. northeast of Culver, *C. C. Deam* 45067. ILLINOIS: Ringwood, *Vasey.* OKLAHOMA: Greer Co., *Stevens* 1016.1; Kiowa Co., *Stevens* 990; Fairvalley, Woods Co., *Stevens* 1652. TEXAS: Hemphill Co., *Eggert* in 1901; *Reverchon* 7 (in 1885); *C. Wright* 709, 1934. WYOMING: Mammoth Hot Springs, *Nelson* 6044. UTAH: Great Salt Lake, *Rydberg & Carlton* 6902; Monroe, *M. E. Jones* 5409b. ARIZONA: Ft. Huachuca, *Lemmon* 2907. NEVADA: Soda Springs, *Shockley* 280. NEW MEXICO: *C. Wright* 1931, 1956. BRITISH COLUMBIA: Kootanie Lake, *Macoun* 7386; Alberni, Vancouver Island, *Macoun* 32,223 (C). CALIFORNIA: San Bernardino, *Parish* 1570, *W. G. Wright* in 1879; Death Valley, *Coville* 586; Owens Valley, *Horn* in 1863; S. Cal., *Parry & Lemmon* 398; Chino Creek, Ontario, *I. M. Johnston* 1137 (P). MEXICO: Sonora, *Thurber* 380; Durango, *Palmer* 189; Puebla, alt. 2120 m., *Arsène* 1474 (U. S.). BERMUDA: *Britton et al.* 1896. CUBA: *C. Wright* 3769. HAITI: *Leonard* 4199.

Described by Torrey from specimens collected by Sartwell at Penn Yan in central New York. Plants from western United States, described as var. *occidentalis* are taller. *C. Wright* 1946 from New Mexico (in Gray Herb.) reaches 19 dm., and Coville[1] mentions a plant with culms 2.23 meters long, but these plants present no other consistent variations. Var. *Congdoni,* reported from California, has a beak and bristles somewhat shorter than the average, but is scarcely distinct. Throughout its range, *Eleocharis rostellata* is variable, especially in the shape of the tubercle, which is at times lanceolate, and again broadly triangular.

19. E. **leptos** (Steudel), n. comb. FIG. 19. Similar to *E. parvula:* erect or arching, from fibrous roots: culms capillary, 3–4 cm. high: spikelets about 3 mm. long, 4–6-flowered, ovate, acute: scales ovate or ovate-lanceolate, membranous, with a scarious margin, and a green keel bordered by brown or purple bands: style 3-fid: stamens 3: achene 1 mm. long, obovate, triangular, the inner face broader and the outer angle obtuse, greenish or light-brown, the surface finely verrucose: bristles wanting.—*Isolepis leptos* Steud. Cyp. 91 (1855). *E. pygmaea* Torr. var. β? *anachaeta* Torr. Ann. Lyc. N. Y. iii. 441 (1836). *Scirpus leptos* Wright in Sauv. Fl. Cub. 176 (1873). *S. parvulus* "*var.*" Boeckl. Linnaea, xxxvi. 478 (1869–1870). *S.*

[1] Coville, Bot. Death Valley Exp., Contrib. U. S. Nat. Herb. iv. 212 (1893).

nanus var. *anachaetus* (Torr.) Britt. Trans. N. Y. Acad. Sci. xi. 75 (1892).—Cuba and Louisiana, westward to Nevada and Mexico and south to Venezuela. LOUISIANA: *Hale* [Red River, acc. to Torrey, Bot. Pac. R. R. Exp. 192 (1857)] (G, N. Y.); near New Orleans, *Drummond* 409, type collection of *E. pygmaea* var. β? *anachaeta* (N. Y.); borders of ponds near James River, *Nicollet* Exp. (N. Y.); NEVADA: Winnemucca, Reno (?), *F. H. Hillman* in 1897 (P). CUBA: *C. Wright* (without number). MEXICO: Tampico, *Palmer* 433; Mazatlan, Sinaloa, *Rose, Standley & Russell* 14105 (N). VENEZUELA: tidal lagoons, Santa Rosa near Maracaibo, *Pittier* 10485 (U. S.) in part (a fragment mixed with *E. maculosa*).

Isolepis leptos was founded on *Parry* 130 from Mexico, which I have not been able to obtain. It was identified by C. Wright with the Cuban plant. Boeckeler, Flora lxiv. 78 (1880) later identified *Isolepis leptos* as a "forma minima" of *Eleocharis triflora*. *E. leptos* has usually been identified with *E. parvula*, but in its almost plano-convex, lightly reticulated achene, without bristles, it appears distinct. In the mountains of western United States it passes into

Var. **coloradoensis** (Britton), n. comb. Coarser and more wiry, but not exceeding 4 cm. in height: spikelets 4 mm. long, and the achenes 1.2–1.5 mm. long.—*Scirpus coloradoensis* Britton, Torreya, iv. 93 (1904).

There is in the Gray Herbarium a specimen of the TYPE collection, *J. H. Cowen* 2576, Shore Lake, Larimer County, Colorado. Although the plant is rather immature the achenes are larger (about 1.2 mm.) than the specimen (*Palmer* 433) from Mexico, and the spikelets are more conspicuously colored with brown. An immature specimen in the Gray Herbarium was collected in IDAHO: *J. F. Macbride* 311, Falk's Store, Canyon Co.

Var. **Johnstonii**, n. var. (FIG. 22), culmis crassioribus, rigidis, compressis, recurvatis; spiculis 4–5 mm. longis; achaeniis 1.5 mm. longis.—Known from a single collection: CALIFORNIA: alkaline shore of Baldwin Lake, San Bernardino Mts. (alt. 7000 ft.), *I. M. Johnston* in 1924 (G, P) (TYPE in Gray Herbarium).

20. E. MACRANTHA Boeckl. FIG. 26. Roots fibrous, brown, rather fleshy: culms soft, erect, striate and sulcate, 8–16 cm. high, about 0.5 mm. in diameter: sheaths firm at the apex, suboblique: spikelets broadly ovate, obtuse, 4–12-flowered, 5–8 mm. long: scales ovate-oblong, acuminate, with brown keel and translucent stramineous sides, spreading and disclosing the achenes: style 3-fid: stamens 3; filaments elongated and flattened: achene obovate, equilaterally triangular, 2.5 mm. long, including the style-base, stramineous; the surface somewhat spongy and finely reticulate: style-base subulate-conic,

nearly 1 mm. long, triangular, with prominent lateral furrows: bristles 3–6, many-toothed, irregular, but not equalling the style-base.—Linnaea, xxxvi. 453 (1869–1870); Boiss. Fl. Orient. v. 387 (1884). *Scirpus hexatrichus* Ehrenberg mss. acc. to Boeckl. (l. c.). SYRIA: "Zwischen die grossen Quelle inter Brumana aus Libanon" *A. Kneucker* in 1904 (G).

Boissier (l. c.) reported it from the littoral region about Beirut (*Ehrenberg*), and added that only one specimen had been seen, and that further observation was needed.

This species is very close to *E. pauciflora*, from which it seems to differ in the larger, broadly ovate heads, and the narrower beak.

21. E. ALBIBRACTEATA Nees & Meyen. FIG. 21. Rootstock extensively creeping, ligneous, brown: culms 2–15 cm. high, slender, rigid and sulcate, sometimes recurved: sheaths deep-brown, with apex oblique and acute, rigid but with a scarious edge; spikelets 2–5 mm. long, broadly ovate, 3–6-flowered, appearing almost black: scales obtuse or acute, striate, shining, black mingled with reddish-brown, sometimes with a whitish region near the margin; the lowest often with a broad greenish midrib: style 3-fid: stamens 3: the filaments flattened and elongated: achene obovoid, trigonous (the abaxial angle obtuse), about 1.5 mm. long, yellow, shining at maturity; the surface somewhat spongy and finely reticulate; the lower part of the style-base thickened and reticulate (triangular in cross-section), as broad as the apex of the achene, the upper part forming a short conical beak: bristles light-brown, strongly toothed, equalling or slightly exceeding the achene.—Nees & Meyen ex. Kunth, Enum. ii. 143 (1837); Linnaea, ix. 294 (1835) *nomen nudum;* Meyen, Reise, 484 (1834) *nomen nudum;* Boeckl. Linnaea, xxxvi. 423 (1869–1870); C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 23 (1901); Hauman & Vanderveken, Phanerog. Arg. i. 208 (1917); Barros, Anal. Mus. Hist. Nat. Buenos Aires, XXXIV. 465, figs. 20a, 20b (1928). *Chaetocyperus albibracteatus* Nees & Meyen in Mart. Fl. Bras. ii.[1] 95. (1842) and Nov. Act. Caes. Leopold Nat. Cur. xix. Suppl. i. 95 (1843) pl. Guianense excl.; Steud. Cyp. 74 (1855) as *C. albobracteatus. E. melanocephala* Desv. in C. Gay, Fl. Chil. vi. 175, t. 71, fig. 1 (1853); R. Fries, Alpine Fl. Arg. 169 (1905). *Scirpus melanocephalus* Griseb. Symb. Fl. Arg. 311 (1879). *S. albibracteatus* (Nees & Meyen) Kuntze, Rev. Gen. i. 757 (1891).—Peru (TYPE region: Lake Titicaca[1]) to Valdivia, Chile (acc. to C. B. Clarke), Juan Fernandez, and in the Andes of Argentina. Also in Ecuador (acc. to C. B. Clarke in Engler, Bot. Jahrb., Beibl. 68: 23 (1901), prope Pomasqui, *Sidero* n. 199). —The following specimens have been examined. BOLIVIA: La Paz, *Buchtien* 4481 (U. S.), *Bang* 71[a] (U. S.). CHILE: Prov. Atacama, Dept. Copiapo, common in subalkaline vega, alt. 2500 meters, *I. M.*

[1] Meyen, Reise, p. 484.

Johnston 4840; Dept. Chañaral, in slightly alkaline meadow, *I. M. Johnston* 4710; Dept. Copiapo, in wet meadow, alt. 2200 m., *I. M. Johnston* 4827; Province of Nuble, Baños de Chillan, open grassy flats, alt. 1800–2000 m., *F. W. Pennell* 12409; Valdivia, *Philippi* (U. S.). ARGENTINA: Prov. Jujuy, Moreno, 3500 m. *R. E. Fries* 695 (U.S.).

The first effective publication, Kunth, Enum. ii. 143 (1837), was based upon a fragmentary specimen and is far less satisfactory than the later publication of *Chaetocyperus albibracteatus*. It is unfortunate that the name *E. albibracteata* must be retained instead of the much more descriptive *E. melanocephala*, for although in young spikelets the pallid midrib of the lowest scale may be prominent, in material which I have seen the pale coloration almost entirely disappears when the spikelets are mature. *Limnocharis albibracteata*, cited in synonymy by Kunth (l. c.), was based upon a misreading of *Limnochloa* in Nees' manuscript (*cf.* Nees, Nov. Act. l. c. footnote). The specimens collected by *Johnston* and cited above were compared by him with authentic material in the Philippi herbarium.

22. E. BOLIVIANA Palla. FIG. 25. Culmis fasciculatis, ex rhizomate erecto (ca. 2 mm. crasso), striatis, sulcatis (ca. 0.5 mm. crassis), 9–14 cm. altis, saepe recurvatis; vaginis fuscis ad basin rufescentibus, apice firmis, truncatis vel subobliquis; spiculis 3–5 mm. longis, late ovatis, 4–8-floris; squamis ovatis, acutis, rufescentibus, in carina interdum viridescentibus, infima obtusa, viridi-vittata; stylo 3-fido; achaenio 1.5 mm. longo (cum stylobasi), obovoideo, triangulo, angulis costatis, viridescenti, lutescente, subtiliter reticulato; stylobasi triangulo, conico, ad achaenium annulo toroso angusto albescenti instructo; setis 6, brunneis, retrorsum dentatis, achaenium superantibus. —Palla in Buchtien, Contrib. Fl. Bolivia, i. 88 (1910), name only. BOLIVIA: La Paz, 3750 m., Jan. 1, 1919, *Buchtien* 4482 (TYPE in Gray Herbarium).

The name only is given by Buchtien, and the species was to have been described in an ensuing volume. *E. boliviana* is close to *E. albibracteata*, from which it differs in larger stature, paler spikelets, and more sharply angled achene, with less conspicuous reticulation and much narrower style-base.

23. E. NUBIGENA C. B. Clarke. FIG. 20. Culms 1–8 cm. long, filiform, from a ligneous creeping rootstock: upper sheath truncate, green, firm: spikelets 2.5–3 mm. long, 3–7-flowered, dark-brown, acute or obtuse: scales glossy-brown, with a green midrib, broadly ovate, somewhat acute; the lowest obtuse; style 3-fid; stamens 3: achene obovoid, triangular, with the outer angle obtuse, 1.5 mm. long,

greenish to light-brown, lightly reticulate: style-base triangular-conic, ½–⅓ as wide as the achene, brown, with a whitened ridge at its junction with the body of the achene: bristles 3–4, light-brown, slender, shorter than or exceeding the achene.—C. B. Clarke in Engler, Bot. Jahrb. xxxvii. 518 (1906) and Kew Bull. Add. Ser. viii. 22 (1908); Barros, Anal. Mus. Nat. Hist. Buenos Aires, XXXIV. 485, fig. 30 (1928). *E. crinalis* Griseb. forma *humilis* Boeckl., ex C. B. Clarke, Engler, Bot. Jahrb. xxxvii. 518 (1906).—In the Andes from Ecuador to Argentina. The specimens of *E. nubigena* in the Gray Herbarium are: ECUADOR: *Spruce* 5913 (TYPE COLLECTION); BOLIVIA: Prov. Larecaja, vic. Soratá, alt. 3100–4100 m., *Mandon* 1414 (in part); vic. La Paz, 10,000 ped., *Bang* 71ª.

Spruce 5913 "in Andibus Ecuadoribus" is the type collection. C. B. Clarke also cites specimens as follows: "B o l i v i a: Puna Patanca, 3700 m s m. in locis humidis (FIEBRIG n. 2636, c. fl. mense Januario, 2887); in Andibus (MANDON n. 1413, LORENTZ et HIERONYMUS n. 65)." In Kew Bull. Add. Ser. (l. c.) the editor has cited "Mandon nn. 14, 13" which obviously refers to *Mandon* 1413 or to both 1413 and 1414; and adds the locality "Argentina, Nevado del Castillo" for *Lorentz & Hieronymus*, No. 65. The *Mandon* specimens are notoriously mixed. *Mandon* 1414 in the Gray Herbarium consists in part of *E. nubigena* and in part of a plant with many-flowered spikelets in a juvenile state. *Mandon* 1414 in the Stockholm Museum is a mixture of *E. nubigena* and *Scirpus cernuus* var. *dura*. *Mandon* 1413 in the Stockholm Museum is *E. costulata* Nees & Meyen.

This dwarf, few-flowered plant is closely related to *E. albibracteata*, from which it differs in smaller stature, paler scales, and narrow ridge at the junction of the achene and style-base. None of the specimens which I have seen exceed 5 cm. in height.

24. E. BREHMERIANA Boeckl. FIG. 24. Dwarf; culms numerous, 3–7 cm. high, from an elongated ligneous rhizome, erect or arching, sulcate: sheaths reddish at base; the apex truncate and forming a ferruginous ring: spikelet ovate, 8–15-flowered: scales ovate, obtuse, dark-brown, with a lighter midrib: style 3-fid: stamens 3: achene 1 mm. long, abbreviated-obovate, golden-yellow, shining, with broadly convex sides and prominent angles, the surface lightly reticulate: style-base brown, pyramidal, nearly as broad as the achene, not articulated, but often with a ridge at the junction of the style-base and the body of the achene: bristles 4–6, brown, slender, equalling the achene.—Allg. Bot. Zeitschr. ii. 33 (1896).—Based on *Mandon* 1416 (in part) from Bolivia. The following specimens have been examined. BOLIVIA: Prov. Larecaja, vic. Soratá, 2600–2900 m., *Mandon* 1416

(mixed with *E. Dombeyana*); southern Bolivia, Padcaya, 2000 m. *Fiebrig* 2524 (issued as *Scirpus cernuus* var. *dura*).

This species differs from *E. nubigena* in the larger and broader spikelets, which have a greater number of flowers, although I have not been able to find any with 20–40 flowers as Boeckeler (l. c.) states. The achene is more turgid, golden-yellow, and the style-base broader than in *E. nubigena*.

Species doubtful or not seen

All these are members of a group very complex in the Andes and not well understood.

E. MELANOMPHALA C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 24 (1901); Barros, Anal. Mus. Hist. Nat. Buenos Aires, xxxiv. 469, fig. 21 (1928).—CHILE, Cordillera, alt. 2100 m. Paso Cruz 34° S. lat. *O. Kuntze* no. 30. "Planta, cum nuce magna, *E. atacamensi* primo aspectu similis, differt stylobasi a nuce conspicue distincta."

E. SIMULANS C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 20 (1901) and Ill. Cyp. t. xxxvi, figs. 19–24 (1908). *Scirpus andinus* Phil. Anal. Univ. Chil. 554 (1873).—"Nux obovoidea plano-compressa, apice triangularis; stylibasis vix incrassata, cum apice nucis usa . . . . . Inter *Scirpum* et *Eleocharidem* quasi media." "Chile (herb. Delessert); Santiago, Cordillera (PHILIPPI n. 36)."

E. LECHLERI Boeckl. Linnaea, xxxvi. 422 (1969–1870); C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 24 (1901); Barros, op. cit. xxxiv. 471, fig. 22 (1928).—Culms 2–5 cm. long, caespitose: achene trigonous, smooth, yellow, abruptly narrowed at apex, lightly striate: style-base depressed-conic, subdisciform, as wide as the achene.—CHILE: Cordillera del Ranco, *Lechler* 795.

E. PLATYPUS C. B. Clarke in Engler, Bot. Jahrb. xxxiv. Beibl. 78: 3 (1904) and Kew Bull. Add. Ser. viii. 23 (1908).—Culm 10–25 cm. long: spikelet 1.8 cm. long: achene ellipsoid, trigonous: style-base "conica, e cellulis magnis rotundo-ellipticis conspicua, in nuce sessili cum hac fere fusa."—Based upon a specimen collected by *Spruce* near Guano, Ecuador.

Geographical Distribution of Series Pauciflorae

The series *Pauciflorae* comprises about 10 species, which occur in saline or alkaline regions, and, except for a rather phenomenal development in the southern Andes, are confined to the Northern Hemisphere. *Eleocharis pauciflora* is a wide-ranging species of boreal alkaline regions in Eurasia and North America, extending south into the Alps and Himalayas and the high mountains of western

United States, reappearing in the southern Andes at an elevation of 7000–10,000 feet.

In Syria the poorly known *E. macrantha* is probably a derivative of *E. pauciflora*.

E. rostellata, on the other hand, seems to be of southern derivation. Sweeping northward from the West Indies and the Gulf of Mexico it forms extensive turf in the salt marshes along the New England coast as far north as southern Maine, and then reappears in southern Nova Scotia, behaving in this manner as the plants of coastal plain affinity. It then occurs sparingly in marl bogs and about salt springs in New York, Indiana, and Michigan. In the high limestone plateau south of the Mohawk River it is certainly not of recent introduction, but seems to have followed the retreating ice of the Wisconsin glaciation, and lodged in a few alkaline areas.[1] In the western United States it is difficult to separate this species from some forms of *E. pauciflora*.

E. parvula, which may perhaps be considered the most primitive member of the section, is found in saline mud along the Atlantic coast of Europe and North America, and to a more limited extent the Pacific coast of North America, and occupies that practically unchanging habitat, the sea-margin. From this species *E. leptos* seems to have been derived, passing from the smooth and sharply angled achene of *E. parvula*, to a slightly verrucose plano-convex achene. *E. leptos* occupies alkaline places in the interior of southwestern United States and northern Mexico and, like *E. pauciflora* and *E. parvula*, produces conspicuous tuber-like buds.

Explanation of Plate 189

(Habit-drawing × ½; achenes × 15, except fig. 17, × 10)

Fig. 17, Eleocharis rostellata, Connecticut, *Harger* (culms, unusually low), achene, New York, *Sartwell;* 18, E. parvula, Newfoundland, *Fernald & Wiegand* 2709; 19, E. leptos, Mexico, *Palmer* 433; 20, E. nubigena, Ecuador, *Spruce* 5913; 21, E. albibracteata, Chile, *Johnston* 4840; 22, E. leptos var. Johnstonii, California, *Johnston;* 23, E. pauciflora, Newfoundland, *Fernald & Wiegand* 4757 (achene unusually elongate); 24, E. Brehmeriana, Bolivia, *Mandon* 1416; 25, E. boliviana, Bolivia, *Buchtien* 3750; 26, E. macrantha, Syria, *Kneucker*.

[1] Svenson, Effects of Post-Pleistocene Marine Submergence, Rhodora, xxix. 107 (1927).

Series Aciculares

(Plate 190)

a. Culms coarse, 0.5–1 mm. in diameter, usually elongated....*b*.
b. Culms strongly flattened (ancipital), about 1 mm. wide, 2–3 dm. high; apex of sheath scarious; achenes without bristles (No. Am.).....30. *E. Wolfii*.
b. Culms not strongly flattened, about 0.5 mm. thick....*c*.
c. Apex of sheath scarious; bristles exceeding the achene (Mex.) 31. *E. acicullariformis*.
c. Apex of sheath firm, divergent; bristles equaling or shorter than the achene (So. Am.).....32. *E. bonariensis*.
a. Culms capillary, usually dwarf, less than 0.5 mm. in diameter..*d*.
d. Spikelets 8-many-flowered....*e*.
e. Culms 1.5–2 dm. high, finely capillary; spikelets purplish-brown; achenes 0.5 mm. long (No. Am.).....33. *E. Reverchonii*.
e. Culms not exceeding 8 cm. in height (except rarely in *E. acicularis*)....*f*.
f. Rootstocks extensively creeping....*g*.
g. Culms and scales light-green; anthers 0.3–0.4 mm. long; white bristles exceeding the achene.....26. *E. Lindheimeri*.
g. Culms dark-green; scales green, with brown markings; anthers 1 mm. long; bristles usually inconspicuous or wanting.....25. *E. acicularis*.
f. Plants cespitose, annual (?), rarely exceeding 4 cm. in height....*h*.
h. Trabeculae about 15 in a longitudinal series....*i*.
i. Anthers 0.2–0.3 mm. long; achene 0.6–0.7 mm. long 27. *E. cancellata*.
i. Anthers 0.7 mm. long; achene 0.4–0.5 mm. long; scales conspicuously attenuate.....28. *E. brachycarpa*.
h. Trabeculae about 30 in a longitudinal series; anthers 0.4 mm. long; achene 0.7–0.8 mm. long.....29. *E. bella*.
d. Spikelets 3–6-flowered....*j*.
j. Style-base elongate-falcate; achene 1.5–1.8 mm. long (including style-base).....36. *E. stenocarpa*.
j. Style-base not elongate-falcate....*k*.
k. Achene 1.5 mm. long; scales spreading and prominently striate.....34. *E. nervata*.
k. Achene 0.7–1.1 mm. long....*l*.
l. Anthers 0.5 mm. long, prominently apiculate...35. *E. costulata*.
l. Anthers 1 mm. long, not prominently apiculate..25. *E. acicularis*.

VARIETIES AND FORMS OF E. ACICULARIS

a. Bristles, when present, finely capillary, equaling or only slightly exceeding the achene....*b*.
b. Culms capillary (rarely triangular), soft....*c*.
c. Spikelets lanceolate; achenes terete or obscurely triangular; tubercle apiculate; bristles finely capillary, often absent var. *typica*....*d*.
d. Culms much elongated, submersed or with floating tips..*e*.
e. Culms always sterile, growing on the bottom in deep water f. *inundata*.
e. Culms sterile; plants extensively branching.....f. *longicaulis*.
e. Some of the culms fertile, elongated, their tips floating on the surface.....f. *fluitans*.
d. Culms not conspicuously elongated....*f*.

f. Culms fertile, dwarf and somewhat rigid, not exceeding 3 or 4 cm. in height.....f. *rigidula.*
f. Culms triangular.....f. *triangularis.*
c. Spikelets linear; culms finely capillary, elongated (So. U. S.) var. *gracilescens.*
b. Culms rigid.....*g.*
g. Culms dwarf, sterile, short and thick, transparent, without longitudinal furrows (Boreal and Arctic).....var. *submersa.*
g. Culms rigid, coarsely striate; achenes furrowed and somewhat flattened; tubercle depressed; bristles absent (W. No. Am.).....var. *occidentalis.*
a. Bristles coarse, brown, much exceeding the achenes (E. Asia) var. *longiseta.*

The forms described herein are to be expected under unusual ecological conditions; the varieties are geographical segregates which displace typical *E. acicularis* at the extremes of its range.

25. E. ACICULARIS R. & S. var. **typica**. Usually forming close mats: culms 2–20 (rarely –25) cm. high, capillary, deep-green, usually angular and sulcate: rootstocks capillary, with abundant stolons; roots firm, white: sheaths loose, reddish-striate at base; the apex scarious and somewhat inflated: spikelets ovate to linear, 2–7 mm. long, acute, 3–15-flowered (usually 5–8-flowered): scales ovate-lanceolate, acute, green, with reddish-brown sides and scarious margins, usually only a few subtending mature fruit: achene 0.7–1 mm. long, obovate-oblong, yellow to white or brown, obscurely 3-angled, with many longitudinal ribs and close trabeculae (about 40–50 in a longitudinal series): style-base narrow, somewhat compressed, conical-triangular: bristles 3–4, brownish, very slender, equalling the achene, often wanting.—*E. acicularis* R. & S. Syst. ii. 154 (1817); Kunth. Enum. ii. 141 (1837); Britton, Journ. N. Y. Micr. Soc. v. 104 (1889); Terracciano, Malpighia, ii. 314 (1888); Hegi, Ill. Fl. Mitteleur. ii. 41 (?1909). *Scirpus acicularis* L. Sp. Pl. i. 48 (1753); Aschers. & Graeb. Syn. ii.[2] 303 (1904); Blomgren in Holmberg, Skand. Fl. pt. ii. 309 (1926). *Mariscus acicularis* Moench, Meth. 350 (1794). *Cyperus acicularis* With. Arr. Brit. Pl. ed. 3, ii. 78 (1796);[1] Missbach & Kraus in Sturm, Fl. Deutsch. ed. 2, ii. 23, t. 6, fig. 1 (1900). *E. costata* Presl. Fl. Cech. 11 (1819). *Isolepis acicularis* Schlecht. Fl. Berol. i. 36 (1823). *Scirpus Chaeta* Schultes, Mant. ii. 72 (1824).[2] *Clavula acicularis* and *C. comosa* Dumort. Fl. Belg. 143 (1827). *Scirpidium aciculare* Nees, Linnaea, ix. 293 (1834). *Chaetocyperus acicularis* Nees in Mart. Fl. Bras. ii.[1] 95

[1] Not ed. 1: 78 (1776) as Richter states. Withering notes the "straws and leaves as fine as a horse hair; the former is not 4-cornered, as Hudson said, but though cylindrical it is often compressed and fluted. As the spike is more properly 2-rowed, . . . as Haller observed, it ought, . . . to be considered as a Cyperus; and the absence of hairs or bristles at the base of the seed adds confirmation to this opinion."

[2] Merely a synonym of *S. trichodes* Muhl., which is not identifiable with *S. trichoides* HBK.

(1842) in part; Steud. Cyp. 74 (1855).—ILLUSTRATIONS: Fl. Dan. ii. t. cclxxxvii.; Svensk. Bot. ix. t. 605; Curtis, Fl. Lond. ed. 2; iv. 49;[1] Sm. Eng. Bot. t. 749; Engl. Bot. ed. Syme, t. 1585; Britton & Brown, Ill. Fl. i. fig. 587; Gray, Man. ed. 7, fig. 250.—Widespread at the margins of ponds, rivers and ditches in the Northern Hemisphere, forming marked varieties at the borders of the range. According to Hultén, Fl. Kamt. i. 164 (1927), "from Iceland, northern Scandinavia and northern Perm south to northern Spain,[2] northern Italy, Tauria and Astrakhan; also in Caucasus. Asia: at Obi from about 67° N. lat., at Yeinisei from about 64° N. lat., and from Kamtchatka south to Pamiroalajsk Prov., Yunnan, Kuantung, Corea and Honshu." In the Gray Herbarium typical North American specimens are represented from southern Newfoundland and southern Labrador west to British Columbia, south to Pennsylvania, West Virginia, central Indiana, central Illinois, Iowa, Missouri, Nebraska, northern Wyoming and northern Idaho. From numerous specimens the following may be cited: NEWFOUNDLAND: Grand Falls, *Fernald & Wiegand* 4705; St. Johns, *Fernald & Wiegand* 4701; Whitbourne, *Fernald, Long & Dunbar* 26,326. QUEBEC: *Longueuil, Victorin* 9346; Riv. Goynish, North Coast, *Victorin & Rolland-Germain* 18126; Natashquan, *H. St. John* 90,182; Lac Tremblant, Terrebonne Co., *J. R. Churchill* in 1922. PRINCE EDWARD ISLAND: Grand Tracadie, *Fernald & St. John*, 928. NOVA SCOTIA: Uniacke Lake, Hants Co., *Fernald, Bartram & Long* 23377; Gavelton, Yarmouth Co., *Fernald, Long & Linder* 20150 (bristles lacking). MAINE: St. Francis, *M. L. Fernald* 120. NEW HAMPSHIRE: *E. F. Williams* in 1910; Gorham, *A. H. Moore* 4298. VERMONT: Wallingford, *W. W. Eggleston* 640. MASSACHUSETTS: Plymouth, *Fernald, Hunnewell & Long* 8891 (without bristles). RHODE ISLAND: Providence, *J. F. Collins* in 1892. CONNECTICUT: Southington, *C. H. Bissell* in 1899. NEW YORK: Springport, *A. J. Eames* 9336; Oneida Lake, *J. V. Haberer* 2229. NEW JERSEY: Tenafly, *H. Dantun* 18D; Singac, *H. Dantun* 18C. PENNSYLVANIA: Pocono, *J. W. Harshberger* in 1904. WEST VIRGINIA: Elkins, Randolph Co., *J. M. Greenman* 102. ONTARIO: Niagara, *J. Macoun* 34,563. MICHIGAN: Manistique, *J. H. Schuette* in 1887; Isle Royale, *W. S. Cooper* 266. OHIO: Garrettsville, Portage Co., *R. J. Webb* in 1913. INDIANA: Gibson, *O. E. Lansing* 2835; Raccoon Sta., *E. J. Grimes* 811. IOWA: Story City, *R. Coombs & C. R. Ball* 438; Iowa City, *M. P. Somes* 194. MANITOBA: east of Forest, *Herriot* 43,043. NORTH DAKOTA: Rush Lake, Huron Co., *C. K. Dodge* 15 and 17; Portal, *M. A. Barber* in 1903; Dickinson, *C. F. Wheeler* in 1908. SOUTH DAKOTA: Brookings, *T. A. Williams* in 1891; White Willow Creek, *T. A. Williams* 73. NEBRASKA: lowlands of the Missouri, *F. Clements* 2551; near Thedford, *P. A. Rydberg* 1337. COLORADO: Divide between Colorado Springs and

[1] This plate is not in the 1st edition, but is in the 2nd edition (1835).

[2] Colmeiro, Pl. Hisp. Lus. (1889), includes most of the Spanish peninsula.

Denver, *M. E. Jones* 160 (P). IDAHO: Montpelier, Bear Lake County, *Nelson & McBride* 1615; Pend Oreille Riv., *Lyall* in 1861. WYOMING: Sheridan, *A. Nelson* 2269. MONTANA: Big Fork, *J. Clemens* in 1908. BRITISH COLUMBIA: Sicamous, *J. Macoun* 7559.

Regarding its presence in India, C. B. Clarke, Journ. Linn. Soc. xxxiv. 51 (1898) says that the single specimen in herb. Rottler can hardly establish the species there. Cheeseman, Fl. N. Zealand 768 (1906), states that it is not recorded from Australia, but in the Gray Herbarium there is a single specimen from *F. von Mueller* (Victoria) which may be an introduction, since it is identical with the European form. Although Clarke cites the species as occurring in the West Indies, the only representative of the section which I have seen from there is *E. Lindheimeri*. Within the range of the typical plant there are several ecological variations which have received names and which may be summed up in the following five forms.

Forma **inundata**, n. f., sterilis, in strato in aqua profundiore crescente.—*E. acicularis* forma *submersa* Druce, Fl. Berks. 524 (1897); *Scirpus acic.*, f. *submersus* Glück, Untersuch. Wasser-und Sumpfgewächse, iii. 573, fig. 103 (1911); *S. acic.* var. *submersus* Blomgren in Holmberg, Skand. Fl. 310 (1896) in part; not *S. acic.* var. *submersus* Hj. Nilss.

This is the common submersed form growing in water 2–8 meters deep, the culms usually becoming somewhat elongated. As Druce describes it "the muddy bottom is covered with it; in this condition it does not flower. Portions brought up by the tow-rope of canal barges are easily recognized by the rhizome. Careful search along the banks will usually be successful in finding it in a fertile state." It is necessary to give this form a new name, since *S. acicularis* var. *submersus* Hj. Nilsson is to be interpreted as a dwarf plant of boreal distribution.

Forma **fluitans** (Doell.), n. comb. Growing in shallow water; culms elongated and floating, some of them fertile.—*Scirpus acicularis* f. *fluitans* Doell. acc. to Glück, l. c. 575 (1911).[1] *E. acicularis* b. *fluitans* Doell, Rhein. Fl. 160 (1843).

[1] In Doell, Rhein. Fl. 160 (1843), which is earlier than Doell, Fl. Baden, i. 311 (1857) as cited by Glück. Doell did not definitely make this a forma but published *E.* (as *H.*) *acicularis* b. *fluitans* with "f l u t h e n d e T e i c h b i n s e mit schwimmenden Halmen." Glück cites as a synonym *Sc. acicularis* forma *filiformis* Wirtgen, but this combination is likewise incorrectly made by Glück. No direct reference is given, but it is probably based on the "authentischen Exemplare W i r t g e n s (. . . Herbarium plant. crit. etc., . . . Fasic, VI, No. 252)" which, as Glück states, have culms both sterile and fertile, and up to 20 cm. in length. It is apparently what Schur. Fl Transsyl. 691 (1885) describes as *E. acicularis* a. *fluitans* "rhizomate ramoso fibroso,

Forma LONGICAULIS (Desmaz.) Hegi. Sterile, submersed, branched, often up to a meter in length; the long culms and branches elongating in the water.—Ill. Fl. Mitteleur. ii. 42 (1909?).—This form is not uncommon in streams and sometimes in lakes, and, as interpreted by Hegi (l. c.), may perhaps include forma *fluitans*. In discussing this plant, Ascherson & Graebner give the following synonymy: *S. acicularis* β. *longicaulis* Desmaz. Cat. Pl. Omises Belg. 42 (1823). "*Clavula acicularis*" [*C. comosa*] β. *longicaulis* Dumort. Fl. Belg. 143 (1827). *S. acicularis* γ *natans* Schrad. in Lej. and Court. Fl. Belg. i. 40 (1828).[1]

Forma **rigidula** (Reichb.), n. comb. Culms short, at most 3–4 cm. long, rigid.—*Scirpus acicularis* var. *rigidula* Reichb. Ic. Fl. Germ. viii. 37, fig. 697 (1846). *S. acicularis* forma *rigidula* Junge, Cyp. Schleswigs-Holstein, 253 (1908).

Forma **triangularis** (Reinsch), n. comb. Culms triangular.—"*Heleocharis triangularis* Reinsch in Doerfler, Herb. Norm. No. 4 384. Schedae XLIV. 188 mit Holzschnitt (1902)," acc. to Aschers. & Graebn. Syn. ii.[2] 304 (1904). "**H. triangularis** Reinsch in Schedae ad Cent. XLIV des Herbar. normale, p. 108," acc. to Palla in Koch, Syn. ed. 3: 2544 (1905). *S. acicularis* II *triangularis* Aschers. & Graebn. Syn. ii.[2] 304 (1903). *Eleocharis acicularis* var. *triangularis* Rouy, Fl. France, xiii. 364 (1912). *S. acicularis* forma *triangularis* Junge, Cyp. Schlesw.-Holst. 253 (1908).

Montell[2] discusses this plant in detail. The specimens issued by him, which I have seen, are clearly dwarf *E. acicularis*. Since a translation of Montell's paper may not be readily available, I am quoting (in translation) the more important portion:

"On the shores of the river Munio [n. lat. 60, Finland], which are dry at low water, there occurs often in great abundance, a small form of *Heleocharis acicularis*, which has for a long time been considered unusual. Previously it has always appeared in the sterile

ramis longe repentibus. Culmis elongatis flaccidis; spicis minimis paucifloris, 3–5 floris, fuscis.—(S c i r p u s a c i c u l a r i s var. n a t a n s Schrad.—S. p a u c i f l o r u s *Dumort.* ap. *Bluff.* et *Fingerh.* comp. 1, 1, p. 90.) . . . (S. f i l i f o r m i s *Sauter* dürfte hierher gehören)." The last two specific names are antedated by *S. pauciflorus* Lightf. and *S. filiformis* Lam. In this synonymy should probably be included *E. acicularis* var. β. *longicaulis* H. Watson in C. B. Clarke, Journ. Bot. xxv. 270 (1887) "culmis 3 dm. longis; spicis 7 mm. longis, atropurpureis." *S. filiformis* Sauter seems to be based on Reichb. Ic. Flor. Germ. viii. t. 294, fig. 696, and is what I have considered under forma *fluitans*.

[1] I can find no formal description by Schrader, but the source of this reference may be the supplementary description of *S. acicularis* "in aquis natantes semipedales, pedales, tenuiores" in the extensive treatment of the *Cyperaceae* by Schrader, Fl. Germ. i. 130 (1806). Lejeune and Courtois (l. c.) also describe *S. acicularis* β. *comosus* (*S. comosus* Dumort. in Mich. Agr. no. 268) "Rhizomate valde repente, cespitibus densis. In locis aqua derelictis".

[2] Montell, Mem. Soc. Fauna et Fl. Fenn. i. 43 (1927).

condition, but I have now found it blooming. Microscopic study of living specimens showed that it did not belong to *H. acicularis* in the narrower sense, but to *H. triangularis* described by P. F. Reinsch from Bavaria, which is to be distinguished from true *H. acicularis* (L.) Br. primarily through the structure of the culm. In the new species the cross-section of the culm is more or less triangular, with three air chambers: in true *H. acicularis*, rectangular, six angled, or almost elliptical, with four projections and an equal number of air chambers. These characters, according to Reinsch, are very constant. What the above-mentioned characters signify is not further mentioned in the author's description on labels issued with No. 4384 in Doerfler's 'Herbarium Normale.' Since the form which I have described seems to vary from *H. acicularis* as described in floras, it seems well to give a short description: The culms are merely 1–2 cm. high, occasionally a little taller, arched, capillary, but rather stiff and dark green. The spikelet is only 1–2 mm. long, often only 1–2-flowered."

This form is perhaps a fertile form of var. *submersa*, described below, and except from a purely anatomical point of view, is scarcely worthy of recognition. The mere fact that the culms are triangular is not of great significance; such transitions should be found between the more or less terete culms of dwarf northern plants (cf. var. *submersa*) and the quadrangular culms of the ubiquitous plants which have been accepted as typical *E. acicularis*. In attempting to define just what is typical, the pathway does not seem at all clear. Linnaeus described the culm as terete (Scirpus culmo tereti, Sp. Pl. l. c.) citing as a synonym *Scirpus magnitudine aciculae* of Flora Lapponica. Curtis in the analysis accompanying the plate of *Scirpus acicularis* in Flora Londinensis, ed. 2 (1835) comments as follows: "The culms of *Scirpus acicularis* have by most modern authors been considered tetragonous. Wahlenberg says they are striated; but I, on the other hand, have always found them to be compressed, convex on one side, and channeled on the other."

Var. **submersa** (Hj. Nilss.), n. comb. Culms dwarf, sterile, short and thick, without longitudinal furrows, transparent, simulating *Eleocharis parvula* (*Scirpus nanus*).—*Scirpus acicularis* β. *submersa* Hj. Nilss. Bot. Not. (1888) 144 (1888), not Blomgren. *E. acicularis* f. *submersa* (Hj. Nilss.) Norman, Christ. Vidensk-Selsk. Forh (1893), no. 16: 43 (1893); Ostenfeld, Fl. Arct. i. 42 (1902) excl. desc. in part. *Scirpus acicularis* f. *submersus* (Hj. Nilss.) Porsild, Meddel. Groenl.

l. 370 (1912), not of Glück, Untersuch. Wasser-und Sumpfgewächse, iii. 573, fig. 103 (1911).—This variety is represented in the Gray Herbarium by specimens collected by Porsild in West Greenland, n. lat. 70° 2′, August 10–11, 1921; from Labrador, *Fernald & Long* 27,522 (deadwater at outlet of Trout Pond, Blanc Sablon River); and apparently A. E. & R. T. Porsild in 1928 from Great Bear Lake n. lat. 67° 0′, long. 119° 45′ W. belongs here. The Labrador and Greenland plants appear as boreal segregates.[1] Porsild, Fl. Disko Island, 48 (1926), records it from Western Greenland, n. lat. 68° 20′ to 71° 42′, and mentions that it hibernates "enclosed in ice." Nilsson's description is as follows (translated):

> E. ACICULARIS L. Culms 3–10 cm. high, erect, bristle-like, opaque, striate with usually four longitudinal furrows; sheaths mostly reddish.—Common on sandy or muddy shores of ponds, ditches, etc.
>
> *β.* SUBMERSA. Culms of variable length, often short and thick, green, with whitish lower portion, terete, without longitudinal furrows, transparent, with clearly distinguishable longitudinal and horizontal partitions within. Spikelets rarely developed, usually remaining small, green, and sterile.—Shallow places in ponds and lakes, usually entirely submerged. Several localities in Norway and Sweden.

According to Nilsson the superficially similar *Eleocharis parvula* is to be distinguished by the presence of terminal buds on the stolons, and by the undulate radial walls of the epidermal cells. In *E. acicularis* these radial walls are straight. An illustration of the radial walls of both species will be found in Raunkiaer, *De Danske Blomsterplanters Naturhistorie* i. fig. 204 (1895–1899).

Var. **longiseta**[2] n. var., setis crassis brunneis, achaenio longioribus. —Eastern Asia. JAPAN: Nagasaki, *R. Oldham* 909 (coll. in 1862), TYPE in Gray Herbarium; Musashi, *Sakuraj* 52. LOO-CHOO ISLANDS, *C. Wright* 357. COREA: Port Chusan, *A. Wilford* in 1891; SIBERIA: Amur medius, *Korshinsky* in 1891.

All the material which I have seen from eastern Asia, with the exception of a specimen collected by *A. Henry* in Yunnan belongs to this well-marked variety. The Yunnan specimen, like the majority of European specimens, lacks bristles.

With two exceptions,[3] the European material which I have seen is

[1] Professor Fernald has called my attention to the similar distribution of *Alopecurus aequalis* var. *natans*, an Arctic segregate, occurring at the Straits of Belle Isle, in western Greenland, and in northern Europe.

[2] *E. acicularis* var. *longiseta* appears on a label accompanying *Oldham* 909 from Japan. According to Oliver, Journ. Linn. Soc. ix. 163 (1867), he worked over the Oldham collection, and it was to be further worked over by Maximowicz. I can find no trace of the publication of this variety.

[3] A collection by *Werenskiold* from Aas, Norway, which has coarse bristles equalling the achene and which approaches var. *longiseta;* and a collection from Hungary, Fl. Hung. Exsic. 481 ii. which has bristles half as long as the achene.

without bristles. The North American material from Newfoundland, eastern Canada, New England and New Jersey, has in general very slender, light-brown bristles equaling the achene; but plants from Cape Cod and the adjacent islands and from the sandy ponds of Plymouth County, Massachusetts, invariably have the bristles absent. This lack of bristles occurs sparingly northward, following the usual Atlantic coastal-plain distribution to southern Nova Scotia, the sandy lake-shores of central New Hampshire and the shores of Lake Champlain.

Specimens which I have seen without bristles are as follows. NOVA SCOTIA: Great Pubnico Lake, Yarmouth Co., *Fernald, Long & Linder* 20151. NEW HAMPSHIRE: Ossipee Lake, *A. S. Pease* 17889. VERMONT: Lake Champlain, Orwell, *W. W. Eggleston* in 1899. MASSACHUSETTS: Winter Pond, Winchester, *C. E. Perkins* (in part) in 1881; Arlington or vic., *C. E. Perkins* in 1883; Spot Pond, Stoneham, *W. P. Rich* in 1894; Boott Pond and Great South Pond, Plymouth, *Fernald, Hunnewell & Long* 8890 and 8891; and numerous collections from Cape Cod. The New England specimens are in the extensive collection of the New England Botanical Club.

In typical material from west of New York State, the larger number of specimens appear to have bristles, although there seems to be no regularity as regards geographic distribution.

Var. **occidentalis**, n. var., culmis rigidis, crassioribus, sulcatis et striatis, 4–7 cm. longis; spiculis 3–6 mm. longis, 6–20-floribus; squamis rigidis, brunneis, in carina fuscis; achaenio angulato, 0.9–1.1 mm. longo; stylobasi depressa, latiore quam in typica *E. acicularis;* setis nullis.—*E. acicularis* var. ? Torr. Bot. Pac. R. R. Exped. 192 (1857).[1]—Montana and Wyoming to California and northern Mexico. MONTANA: Bigfork, alt. 3000 ft., *M. E. Jones* 9381 (P), 9382 (P); Polson, alt. 2800 ft., *M. E. Jones* 9383 (P). WYOMING: Nez Perces Creek, *A. & E. Nelson* 6552. IDAHO: St. Anthony, *Merrill & Wilcox* 816; Salmon, Lemhi Co., alt. 4500 ft. *E. B. & L. B. Payson* 1889; Goose Creek, Washington Co., *M. E. Jones* (without number) (P); Montpelier, *Nelson & Macbride* 1615 (P). UTAH: Salt Lake City, *M. E. Jones* 1069 (P) in 1881 (P); Panquich Lake, *M. E. Jones* 6019b (P). NEW MEXICO: Colfax Co., *P. C. Standley* 13931; Raron, B. Mesa, *I. E. Diehl* 98 (P). ARIZONA: White Mts., *D. Griffiths* 5269. CALIFORNIA: Santa Barbara, *Rothrock* 80 (TYPE in Gray Herbarium); near San Francisco, *J. M. Bigelow* in 1853–1854; Yosemite Valley,

[1] "Culmo crasso brevi, spica ovato-lanceolata valde compressa acuta 6–7-flora. Wet places near San Francisco; April 8; not mature. Differs from the ordinary form of the plant in its stout culm (which is 2–3 inches high) and much compressed dark chestnut-colored scales. There are 3 stamens and a 3-cleft style, which has a distinct tubercle at its base; but no bristles were found."

Bolander 6229; Bear Valley, San Bernardino, *S. B. & W. F. Parish* 1061 A; Crescent City, *Abrams & Bacigalupi* 8341 (P); Inglewood, Los Angeles Co., *Abrams* 1451 (P); Bluff Lake, San Bernardino Mts., alt. 5200 ft., *Munz & Johnston* 2903 (P); Bear Valley, San Bernardino, *Abrams* 2092 (P); Tolland, *C. F. Baker* herb. 3094 (P); Tahquitz Valley, San Jacinto Mts., *Munz* 6067 (P). OREGON: *E. Hall* 560. WASHINGTON: Pullman, *E. J. Hardwick* in 1895; W. Klickitat Co., *Suksdorf* 225; Calispel Valley, *F. Kreger* 331. MEXICO: near Colonia Garcia, Chihuahua, *Townsend & Barber* 65; Sierra Madre, Chihuahua, alt. 7,000 ft., *M. E. Jones* in 1903 (P).

This variety, confined to western North America, is distinguished by the rigid culms and scales, larger achenes which are strongly angled and sometimes flattened, and broader more depressed tubercle. *Standley* 13931 and *Rothrock* 80 would readily pass as a species distinct from *E. acicularis*, but in the states of Washington, Oregon, Idaho, and Montana, there seems to be a transition into typical *E. acicularis* The very dwarf plants, *F. M. Reed* 2480, margin of Surprise Lake, elevation 9000 ft., San Jacinto Mts. (Gray Herb.) and *Munz* 6376, sandy shores, Hidden Lake, elevation 8000 ft. San Jacinto Mts. (Herb. Pomona College) probably belong to this variety.

Var. **gracilescens**, n. var., culmis tenuissimis, 1–3 dm. longis, striatis; spiculis linearibus, 3–6 mm. longis, 6–15-floris; squamis ovato-oblongis, acutis vel acuminatis, carinatis, viridibus vel purpureo-striatis, in margine hyalinis; staminibus 1.2 mm. longis; achenio anguste obovoideo, stylobasi conica; setis nullis.—Western Tennessee to Oklahoma and California. TENNESSEE: low woods about Reelfoot Lake, *S. M. Bain* 482. MISSOURI: St. Louis, *Engelmann* in 1845 (TYPE in Gray Herbarium). OKLAHOMA: Hattenville, Ottawa Co., *G. W. Stevens* 2497; Limestone Gap, Indian Territory, *G. D. Butler* 28. CALIFORNIA: Yosemite Valley, alt. 4000–5000 ft., *Abrams* 4657 and probably Mendocino City, *Bolander* 4768; Yosemite Valley, *Torrey* 553.

The Engelmann specimen which has been taken by me as the type bears the annotation by Engelmann, "*Eleocharis* n. sp.? *E. acicularis* Auct. am., culmo tereti etc." It is very distinct from typical *E. acicularis* in its elongated, very slender culms, and in the elongate spikelets. Very little of the material studied has ripe achenes.

(To be continued.)

TWO CYPERACEAE NEW TO THE BOSTON DISTRICT.—CYPERUS HOUGHTONII Torr. On Sept. 9, 1928, I found several specimens of this species growing in a gravel pit in West Stoughton, Massachu-

setts. The plant is of local occurrence in New England and has so far been found only in Vermont and Massachusetts. In Vermont it is not uncommon on sand plains in the Burlington region and has also been collected at Castleton and at Fairlee Lake, the latter close to the Connecticut River. In Massachusetts the species was recorded by Dr. N. L. Britton[1] many years ago from Wareham and more recently from Mount Washington, Berkshire County, by Mr. Ralph Hoffman.[2] Professor M. L. Fernald informs me that the former locality is represented in the Gray Herbarium and the herbarium of the New England Botanical Club by specimens of the original collection made by G. G. Kennedy and L. H. Bailey in sand barrens at Wareham on August 23, 1890, and that there is also a sheet in the Gray Herbarium collected on sand plains at South Hadley and sent to Dr. Gray by John A. Paine, Jr.

CAREX POLYMORPHA Muhl. A sheet of *Carex* which had lain unnamed in my herbarium for nearly twenty years has recently been identified as this species by Dr. Heinrich Hasselbring and by Mr. K. K. Mackenzie. I collected it in dry sandy soil along a wood path in Stoughton on May 29, 1909. The species, which is characterized as local in our manuals, is not recorded in the Flora of the Boston District. Part of the specimen has been placed in the herbarium of the New England Botanical Club.—S. F. BLAKE, Bureau of Plant Industry, Washington, D. C.

[1] Bull. Torrey Club **18**: 369. 1891.
[2] Proc. Boston Soc. Nat. Hist. **36**: 232. 1922.

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A NEW FORM OF RED CEDAR FROM INDIANA

Paul C. Standley and J. Francis Macbride

Juniperus virginiana L., forma **Bremerae**, f. nov., arbuscula 2–4 m. alta, coma anguste pyramidali; ramis ramulisque erectis; foliis viridibus patentibus acicularibus plerumque 4–5 mm. longis haud squamaeformibus sed foliis ad apicem ramulorum superiorum aliquid imbricatis, demum ubique liberis.—Indiana: sand dunes, "Stock-yards" Addition, near Port Chester, Porter County, Nov. 4, 1928, *Mary Bremer* (Type, Field Museum).

In spite of the great number of variations of the well-known Red Cedar that have received formal taxonomic designation, we have found none that agrees, from description, with the characters of this interesting little tree, native to the sand dunes of Lake Michigan in northern Indiana. In habit it conforms with the typical, i. e. columnar or narrow-pyramidal, forms of the species, none of which, apparently, have entirely green, acicular leaves. The foliage at once suggests that of *J. communis* L.

It is a pleasure to name this indigenous variant of Red Cedar for Miss Mary Bremer of Crown Point, Indiana, who discovered several trees, essentially uniform in character, growing in the vicinity of typical *Juniperus virginiana*. In associating Miss Bremer's name with a form of this tree, of such great horticultural merit, we would express our appreciation of her work in establishing the unusual Conservation Gardens of Dune Forest near Port Chester. In these gardens she has established hundreds of species of the plants of the Indiana Sand Dunes, arranging them, for the most part, according to their ecological affinities. Included among them is a grouping of typical Red Cedar, to which she hopes to add forma *Bremerae* before the threatened de-

struction of the type trees, now growing on property which has been subdivided.

Field Museum of Natural History.

AIRA SPICATA L.

Kenneth K. Mackenzie

A very curious performance by Linnaeus was when in 1753 in his Species Plantarum, he gave the name *Aira spicata* to two widely different species. His first use of this name is found on page 63 where the name was given to an Indian plant (Aira No. 1) and his second use of the name is found on the immediately following page (64) where the name was primarily applied to a plant (Aira No. 7) from the mountains of Lapland studied by himself.

Linnaeus soon noticed his error and emphatically corrected it by giving new names to both species. The first plant he renamed *Aira indica* and the second he renamed *Aira subspicata* (Syst. Nat. ed. 10 873 1759). He was not, however, careful in his work, for we next find him writing *Aira indica* and *Aira spicata* (Sp. Pl. ed. 2, 94–5 1762; ed. 3 94–5 1764). Then we soon find him writing *Aira indica* and *Aira subspicata* (Syst. Nat. ed. 12 91 1767).

The first referred-to species was next transferred by him to the genus *Panicum* as *Panicum indicum* (Mant. Pl. **2:** 184 1771) and there it has since remained. It must, however, be noted that the first *Aira spicata* of Linnaeus is the first binomial name which was applied to this species. It is an entirely valid name, although it is quite possible that the specific name "*spicatum*" could not now be used under *Panicum*.

The second referred-to species became universally known under the new name given to it by Linnaeus of *Aira subspicata* (Willd. Sp. Pl. **1:** 377 1797) or by the name *Trisetum subspicatum* (L.) Beauv. (Beauv. Agrost. 88, 180 1812; Kunth Enum. Pl. **1:** 295 1833; Gray Man. ed. 6 653 1885).

This course continued until 1890 when Richter (Pl. Europ. **1:** 59) formed the combination *Trisetum spicatum* (L.) Richter. The name so formed has been taken up both in Britton & Brown Ill. Fl. (ed. 2) **1:** 217 1913 and in Gray Manual ed. 7 139 1908. The fact that this latter name is invalid because based on a name invalid

because it is a homonym has been entirely ignored. The reason for this may be that there is an error in the Index Kewensis (**1:** 68 1893) in that the references to the Linnaean *Aira spicata* are given in reverse order to what they should be.

Under the American Code of Nomenclature with its emphasis on the invalidity of all homonyms and its recognition of page priority, there is no doubt about the invalidity of the name *Trisetum spicatum* (L.) Richter. The Vienna (Brussels) Code is typically vague and difficult of application, but as I read Article 51 (2) and Article 56 and the examples given the same results would be reached.

In this connection it may be well to point out that a statement made by Father Louis Marie in RHODORA **30:** 238 (1928) 1929 concerning the type of the second *Aira spicata* L. is of very doubtful correctness. He says "one must go back to Scheuchzer, quoted by Linnaeus in his original diagnosis of *Aira spicata* to reconstitute the type of *T. spicatum.*" It is true that Linnaeus cited Scheuchzer, as stated, but his type was a Lapland plant studied by himself, the habitat given by him being "Habitat in Lapponiae alpibus." The point may not be of any importance but as Father Louis Marie gives fourteen named varieties "departing from Scheuchzer's type," it may be of importance.

MAPLEWOOD, NEW JERSEY.

MENYANTHES TRIFOLIATA, VAR. MINOR

M. L. FERNALD.

To one who from boyhood has been familiar with the common white-flowered Buck Bean or Bog Bean of Atlantic North America there comes a real surprise when he sees European plates of *Menyanthes trifoliata* L. In such works as Smith's English Botany, vii. t. 495 (1798), Baxter's British Flowering Plants, iv. t. 245 (1839), Mrs. Loudon's British Wild Flowers, t. 45 (1847) or Anne Pratt's Flowering Plants and Ferns of Great Britain, iv. t. 139 (1873) *Menyanthes trifoliata* is represented with flesh-pink to crimson corollas 2–3 cm. broad; but the plant generally distributed in quagmires, wet meadows and pond-margins of eastern North America has the flowers white or at most slightly purplish on the outside or at the tips of the corolla-lobes, and it is beautifully illustrated in natural color in the painting

by Miss Elsie Louise Shaw in Mrs. Dana's How to Know the Wild Flowers (ed. of 1900), t. xix, and in the color-photograph in House, Wild Flowers of New York, pt. 2, t. 169 (1918). In the plant of Atlantic America the expanded white corollas are usually only 1.5–2 cm. broad, though occasionally a little larger, while some herbarium-specimens of the Eurasian plant indicate that the corolla there may sometimes be under 2 cm. in breadth; and, while many European plates indicate pink or purple corollas, others show them white, and European descriptions ordinarily state that they are white above but pink or purple outside. The difference in color is not, therefore, absolute, though there seems to be a stronger tendency to roseate coloring in the Eurasian than in the Atlantic American plant, just as in the Eurasian the flowers are usually much larger. Study of abundant specimens and plates shows, also, that the beard of the upper surface of the corolla is more abundant and longer in the Eurasian than in the Atlantic American plant, in the Old World material covering all or nearly all the upper surface of the corolla-lobes, in the eastern American being more concentrated from the middle to the bases of the lobes.

I have sought in vain for any morphological differences: the leaflets seem to be of the same form and venation; the stipular bases alike; the racemes similar, though in the Eurasian often longer and with greater tendency to subverticillate arrangement of flowers; the pedicels, variable in length in both series, elongate or, at the northern limits of each, very abbreviated; the bracts and calyx-lobes with similar variation; the dimorphic stamens and styles similar; and the seeds apparently identical. There seem to be, then, no satisfactory specific characters to separate the two plants, but as geographic varieties they are well marked. The typical Eurasian plant enters North America on the Pacific slope, all the material from Alaska to California belonging to it; and it approaches our northeastern region in Greenland. The material before me from the Rocky Mountain region is not in condition for precise identification; but all specimens from east of the Rocky Mountains belong definitely to the Atlantic American variety.

The latter plant should apparently be called *Menyanthes trifoliata*, var. *minor* Michx., though the variety is ascribed to Michaux only through a characteristic blunder of Rafinesque. In his Flora-Boreali Americana, i. 126 (1803) Michaux, calling the plant unequivocally

M. trifoliata, appended the "*Obs.* Parvitate tantum ab Europaea differt." In 1820, Jacob Bigelow, American Medical Botany, iii. t. xlvi. (pp. 55–57), likewise unequivocally calling the plant *M. trifoliata*, stated that: "I have compared specimens of the native, and foreign plant, without being able to perceive the least definable difference, except in size; the American being smaller. Yet, if we admit the statements of botanical writers, the plant flowers in England at least a month later than it does in the neighbourhood of Boston, a circumstance not usual in other species of vegetables . . . . The colour [of corolla], in the American variety, is generally white, with a tinge of red, particularly on the outside . . . . In New England this plant flowers about the middle of May." Then came Rafinesque, copying Bigelow's plate (with the addition of a rootstock) and copying in none too clear fashion Michaux's and Bigelow's observations. In his Medical Flora, ii. 33–35, t. 63 (1830) Rafinesque published the eastern American plant as *Menyanthes verna:*

Sp. *Menyanthes verna*, Raf . . . corolla fringed at the base, not ciliated.

DESCRIPTION . . . corolla white, with a red tinge, a short tube, five oval acute segments, spreading or revolute, fringed at the base above, ...

HISTORY. This plant is common to the north of the two continents. The American plant, figured here, is confined to the North, in Canada, New England, New York, Pennsylvania, and Ohio, but it spreads in the mountains as far south as Virginia. It forms a peculiar species called variety *Minor*, by Michaux and Bigelow, which is well distinguished from the *M. trifoliata* of Europe, of which the characters are:

M. trifoliata L. . . . corolla ciliated and fringed all over above; flowers rose colour, blossoming in summer. It is a beautiful plant, growing in or near marshes, bogs, ponds, and brooks, blossoming in April and May.

Coming as it does after the assertion that *M. trifoliata* blossoms "in summer," the statement that it blossoms "in April and May" was presumably intended by Rafinesque to apply to his *M. verna*. Similar confusion will be noted in the paragraph headed HISTORY: "This plant [the endemic American *M. verna*] is common to . . . the two continents"; and, again, "The American plant . . . forms a peculiar species called variety *Minor*, by Michaux and Bigelow." But, applying the leniency usually necessary in interpreting Rafinesque, it is evident that he took Michaux's statement

that our plant "Parvitate tantum ab Europaea differt" and Bigelow's similar assertion as equivalent to publication of a variety. Since the name, *M. trifoliata*, var. *minor*, ascribed by Rafinesque to Michaux, is definitely associable with our plant, less confusion will result by taking it up than by substituting a new varietal name.

The suggestion by Bigelow, that var. *minor* flowers a month earlier than typical *M. trifoliata*, was based on inadequate data. The Eurasian plant in the Gray Herbarium shows flowering dates ranging from late April (northern Italy) and early May (Bavaria, Austria, Japan) to June (Switzerland, Silesia, England, Iceland, Japan); the flowering material from Greenland was collected in late July and early August; and the flowering material of typical *M. trifoliata* from Pacific America shows a similar range: April to August (in the Sierra) in California, late May to mid-June in Oregon, mid-May to late-June in southern Alaska. Near the Atlantic seaboard in America var. *minor* shows a quite similar flowering period: southern Labrador, July; Newfoundland, June to mid-July; Quebec, June and July; Maine, May 27 to June 22; Vermont, June 1 to June 18; Massachusetts, May 3 to June 12 (rarely to August 27); Rhode Island, May (rarely September).

With no morphological differences and no appreciable differences of habit, habitat or flowering season, but with a striking difference in the size of the corolla and in the degree of its bearding and with a strong tendency to white flowers, the plant of eastern America constitutes a good geographic variety:

Menyanthes trifoliata L., var. minor Michx. ex Raf. Med. Fl. ii. 34 (1830). *M. verna* Raf. l. c. 33 (1830).

Gray Herbarium.

Andropogon glomeratus in Rhode Island.—In the Seventh Report of the Committee on Floral Areas in Rhodora for June, 1929, *Andropogon glomeratus* (Walt.) BSP. was reported only from Massachusetts.

This species is locally common on sand barrens in South Kingstown, Rhode Island, where it was collected by Professor J. Franklin Collins and the writer on October 13, 1923. Specimens have been placed in the herbarium of the New England Botanical Club by Professor Collins.—Albert E. Lownes, Providence, Rhode Island.

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS

H. K. Svenson

(*continued from page 191*)

26. E. **Lindheimeri** (C. B. Clarke), n. comb. Fig. 31. Culms matted, 3–8 cm. high, light green, soft and spongy, striate: rootstocks slender and extensively creeping, white or light brown; roots fibrous, white: sheaths membranous, closely investing the culm, fugacious: spikelets ovate, acute, 3–4 mm. long, 6–12-flowered: scales ovate-lanceolate, the lower blunt, green, striate, the upper often strongly keeled at the tip: style 3-fid: stamens 3; anthers 0.3–0.4 mm. long: achenes narrowly obovate, yellowish, about 0.7 mm. long (excluding the narrow conical beak), with elevated longitudinal ridges and about 30–40 close trabeculae in a longitudinal series: bristles usually 4, very slender, white, retrorsely toothed, exceeding the achene.—*E. acicularis* var. *Lindheimeri* C. B. Clarke ex Britton, Journ. N. Y. Micr. Soc. v. 105 (1889) in syn.; *E. acicularis* var. *nana* Torr. acc. to Britton, Journ. N. Y. Micr. Soc. v. 105 (1889) in syn.; *E. acicularis* var. *radicans*[1] Britton, Journ. N. Y. Micr. Soc. 105 (1889); perhaps *S. radicans* Poir.—Michigan, Oklahoma and eastern Texas, west to northern Mexico and southern California. Michigan: Olivet, *H. L. Clark* in 1905 (as *S. nanus*). Oklahoma: moist creek banks, Weathersford, Custer Co., *G. W. Stevens* 910. Texas: *C. Wright; Lindheimer* 315 (without locality) type coll.; in a small stream, Hantsville, Walker Co., *R. A. Dixon* 364. California: Cocomungo, *J. M. Bigelow* in 1854 (as *E. pygmaea* Torr.); San Bernardino, *W. G. Wright* in 1880; Red Hill, Upland, *I. M. Johnston* in 1916 and no. 1176; Claremont, *I. M. Johnston* in 1916 (P); San Antonio Mts., *I. M. Johnston* 1735; sandy bed of Santa Ana River, San Bernardino Co. and vic. of San Bernardino, alt. 1000 ft., *S. B. Parish* 5284. Mexico: Fronteras, Sonora, *C. V. Hartman* 989; sandy margin of Rio Sonora, *G. Thurber* in 1851; vic. of Fuerte,

[1] This plant, as Britton has noted, may be identified with *Scirpus radicans* Poiret, Encyc. vi. 751 ((1804), which was antedated by *S. radicans* Schkuhr (1793), a valid European species. Poiret's plant came from Porto Rico and was characterized by sheaths "membraneus, très-mince, glabre, d'un pourpre-rougatre, un peu striée, tronquée obliquement à son orifice, ou prolongée en une pointe subulée." The spikelet "presqu'ovale, obtus d'un vert-pale, ... les deux inférieures [écailles] en forme de spathe, & presque de la longueur des fleurs." Kunth, Enum. ii. 142 (1837) referred to *E. radicans* the *Sc. radicans* Poir. excl. syn., i.e. excluding *S. atropurpureus*. There are, however, some difficulties involved. The achene clearly places Kunth's plant among the *Aciculares;* but the Mauritius plant with achene "turgide biconvexum" is clearly something else. *E. radicans* Kunth is to be identified as one of the Peruvian species allied to *E. acicularis*. The critical descriptive characters are "squamis carinatis, . . . carina viridi, lateribus hyalino-albidis, omnibus fertilibus; . . . achenio (immaturo) elliptico-oblongo, teretiusculo, transverse striatulo, ecostulato, stramineo-flavido, nitido, basi styli conica fuscescente rostrato; pericarpio membranaceo, laxo; setis 5, retrorsim spinulosis, albidis." I have seen no South American material which approaches the Texan plant.

Sinaloa, *Rose, Standley & Russell* 13586 (U. S.); vic. of Magdalena, Sonora, *Rose, Standley & Russell* 15104.

Readily distinguished by the spongy culm, wholly green scales, and long bristles.

27. E. CANCELLATA S. Wats. FIG. 30. Annual?; dwarf, cespitose: culms 1.5–4 cm. high, radiating from a vertically branched root-stock, capillary, striate and sulcate, light-green: sheaths closely investing the culm, fugacious: spikelets 2–4 mm. long, ovate to ovate-lanceolate, acute; flowers numerous: scales obtuse, striate, green, with a narrow brown line on each side, with margin and tip hyaline, at maturity often exposing the achenes: style 3-fid: anthers 0.2–0.3 mm. long: achenes broadly obovate-pyriform, 0.6–0.7 mm. long (including the small conical style-base), white and shining, with 6 longitudinal ribs and about 15 trabeculae in each longitudinal series, and with conspicuous translucent fenestration between the trabeculae: bristles lacking.—Proc. Am. Acad. xviii. 170 (1883); Hemsley, Biol. Cent. Am. Bot. iii. 455 (1885); Britton, Journ. N. Y. Micr. Soc. v. 105 (1889).—New Mexico to central Mexico. NEW MEXICO: *C. Wright* 1937. This specimen is a dwarf form not more than 1.5 cm. high. It is the "small form" of *E. acicularis* cited by Britton (l. c.) and by Torr. Mex. Bound. Surv. 228 (1859), collected by C. Wright in 1851. MEXICO: In paludosis Morales, San Luis Potosi, *Schaffner* 575 (in part) (1876) (the specimen labeled by *S.* Watson in the Gray Herbarium may be considered as the TYPE); region of San Luis Potosi, alt. 6000–8000 ft., *Parry & Palmer*, 912; wet hollows of mesas near San Luis Potosi, *Pringle* 3269.

In habit similar to *E. bella*, from which it is readily distinguished by the smaller, coarsely trabeculate achenes.

28. E. **brachycarpa**, n. sp. (fig. 34), non cespitosa; culmis 1–7 cm. longis, capillaribus, obscure angulatis; spicula 2–4 mm. longa, ovata, multiflora; squamis viridibus vel fusce stramineis, lanceolatis attenuatis, striatis, in margine scariosis; stylo 3-fido; antheris 0.7 mm. longis; achaenio 0.4–0.5 mm. longo, obovato, fere tereti, longitudinaliter circa 15-trabeculata; stylobasi anguste conica, brunnescente; setis nullis.—MEXICO, in the region of the lower Rio Grande. The following specimens are in the Gray Herbarium: *Berlandier* 2496 "in locis paludosis, Matamoros, April 1834" (TYPE in Gray Herbarium); *Berlandier* 2324, "in locis humidis inter San Fernando et Matamoros Feb. 1831"; *Berlandier* 894 "in locis humidis prope Matamoros, Feb. 1831"; *Berlandier* 996, "in locis paludosis de Matamoros a Mueres, April 1834."

This species differs from *E. cancellata* in its non-cespitose habit, flexuous culms, long-attenuate scales, long anthers, and shorter, narrower achenes. *Berlandier* 2324 and 894 are dwarf plants only 1–1.5 cm. high.

29. E. **bella** (Piper), n. comb. Fig. 29. Annual ?; rootstock very short, the plant forming dense round tufts 5–10 cm. in diameter: culms ascending, 2–6 cm. high, light-green, capillary, soft, sometimes angled and sulcate: sheaths loose, inflated at the summit, acute: spikelets 2–3 mm. long, blunt or acute, ovate, many-flowered: scales ovate-lanceolate, keeled at summit, acute, with a broad green midrib and purple-striated sides: style 3-fid: anthers 0.4 mm. long: achene yellowish or white, linear-obovate, 0.7–0.8 mm. long, obtusely 3-angled, with 3 primary and many secondary longitudinal ridges and about 30 trabeculae in each longitudinal series: bristles none.—*E. acicularis* var. *bella* Piper, Fl. Palouse Region, 35 (1901) and Contrib. U. S. Nat. Herb. xi. 160 (1906). *E. acicularis* var. *minima* Torr. in Britton, Journ. N. Y. Micr. Soc. v. 104 (1889). *E. acicularis* Jepson, Fl. Calif. pt. vi. 195, fig. 16 (1922).—Idaho and Washington, south to New Mexico and California. The following specimens have been examined. Idaho: Forks of St. Mary's River, *Leiberg* 1139. Nevada: Truckee River, alt. 4000 ft., *S. Watson* 1211; Silver Mts. 30–40 miles east of Carson City, *Bolander*. New Mexico: Mogollon Mts., West Fork Gila River, *O. B. Metcalf* 588. Arizona: Rucker Valley, *Lemmon* 481. California: Red Clover Valley, Plumas Co., *A. A. Heller & P. B. Kennedy* 8693; Hayden Survey, coll. *Hooker & Gray;* Moulton, Warren Mts. *Griffiths & Hunter* 478; Headwaters of Chico Creek, Butte Co., *A. A. Heller* 11596; 40 miles north of Mt. Shasta, *E. L. Greene* 936; Big Trees, *Hillebrant* 2332; Cayumaca Lake, San Diego Co., *Abrams* 3848, *Munz & Harwood* 7200; Palomar Mts. San Diego Co., *P. A. Munz* 8268 (G. P.); Eshom Valley, Tulare Co. *Clemens* in 1910; Burton Flats, San Bernardino Mts. *Munz* 6317 (P); Soda Springs, Nevada Co., *M. E. Jones* in 1881; Prattville, *M. E. Jones* in 1897; Emigrant Gap, *M. E. Jones* 2905; Kenworthy, San Jacinto Mts. *Munz* 5472; Sisson, *C. F. Baker* 3825. Oregon: near Fort Klamath, alt. 1470 m., *J. B. Leiberg* 650; Swan Lake Valley, Klamath Co., *E. I. Applegate* 769; *E. Hall* 566 (as *E. acicularis* var. *minima* Torr.); muddy flats of the Columbia river, *T. Howell* 609. Washington: Pullman, *C. V. Piper* 3055 (G. P.) (type coll.); Spokane, *C. V. Piper* 2642; Waitsburg, *R. M. Horner* in 1897; Pullman, *Elmer* 11417 (P) and 24 (P); springs, W. Klickitat Co., Cascade Mts., *Tweedy* 42.

This species is readily distinguishable from *E. acicularis* by the cespitose habit and the minute anthers, and from *E. cancellata,* of similar cespitose habit, by the larger achenes and close trabeculae. *E. Hall* 566 seems to have had the tops chewed off, forming unusually dwarf plants.

30. E. Wolfii A. Gray. Fig. 36. Culms sparsely caespitose, from slender creeping rhizomes, 1.5–3 dm. high, about 1 mm. in diameter, two-edged, often concavo-convex or inrolled, lightly striate:

sheath oblique and scarious at the apex: spikelets slender-ovoid, acute, 5–9 mm. long: scales oblong-ovate, acute, purple-striate, with scarious margin: style 3-fid: anthers 3, 1 mm. long: achene pyriform, light-brown, shining, 1 mm. long, strongly costulate with 9 longitudinal ribs and about 40–45 trabeculae in each longitudinal series: style-base depressed-truncate, with an apiculate center: bristles lacking.—A. Gray in Patterson, Cat. Pl. Ill. 46 (1876); Britton, Journ. N. Y. Micr. Soc. v. 105 (1889); Britton & Brown, Ill. Fl. i. 252, fig. 588 (1896); Robinson & Fernald in Gray, Man. ed. 7: 183, fig. 251 (1908). *Scirpus Wolfii* A. Gray, Proc. Am. Acad. x. 77 (1875). —Margins of ponds and in wet meadows, Indiana to Kansas and Louisiana. Indiana: Hanover, Jefferson Co., *C. C. Deam* 38893; Illinois: Canton, *J. Wolf* (type in Gray Herbarium); *E. Hall* in 1861; Wady Petra, *V. H. Chase* 1451, and 191 in Kneucker Cyp. and Junc. Exs. Iowa: Emmett Co., *I. A. Cratty* in 1882. Louisiana *J. Hale*. Kansas: Cherokee Co., *A. S. Hitchcock* 1050.

Approached in size only by *E. bonariensis* to which it is united by C. B. Clarke, but readily distinguished by the rigid ancipital culms which are usually provided with minute tooth-like elevations at the margins. This condition is unique in the genus, and resembles to some extent the toothed culms of *Fimbristylis*. These ancipital culms may become inrolled to such an extent that they appear almost cylindrical in cross-section.

31. E. acicullariformis Greenman. Fig. 37. Rhizome 1–2 mm. in diameter, branching, light-brown: culms 5–8 cm. high, 0.5 mm. thick, rigid, sulcate, tufted at the nodes of the rhizome; sheaths reddish, striate below, green above, with acute scarious apex: spikelets elliptic-ovate, 4–6 mm. long, about 12-flowered; scales ovate, obtuse, reddish-brown, with green keel and scarious margin: style 3-fid: stamens 3; anthers about 1.2 mm. long: achene oblong-obovate, 1.2 mm. long, rather sharply narrowed at the summit, somewhat compressed, with numerous longitudinal ribs, and about 60–70 very close trabeculae in each longitudinal series: style-base conical, about ⅓ as broad as the achene: bristles 3, white, retrorsely toothed, slightly exceeding the achene.—Proc. Am. Acad. xxxiv. 566 (1899).

Known only from a single collection, *Pringle* 6818, Federal District, Mexico, May 7, 1898. It differs from *E. acicularis* in stouter habit and thickened rhizome, more conspicuously sheathed culms, and white, more closely toothed bristles, and in the larger achenes. It might be confused with *E. bonariensis*, of similar large stature, but may be readily distinguished from that species by the scarious sheath-apices.

32. E. bonariensis Nees. Fig. 32. Rootstocks creeping, 1–1.5

mm. thick: culms fascicled, somewhat rigid, 1.5–4 dm. high, about 0.5 mm. wide, bright-green or yellowish, striate and sulcate: sheaths yellow or brown, often reddish at the base; the firm apex obtuse, elongated and spreading: spikelets lanceolate, 4–8 mm. long, the lowest scale about half the length of the spikelet: scales ovate-lanceolate, obtuse or acute, green, with reddish sides: style 3-fid: stamens 3, anthers 1.5 mm. long: achene elliptic to narrowly obovate, 1–1.3 mm. long, with many longitudinal ribs and about 50–60 trabeculae in each longitudinal series; style-base small, conical, ⅓ as wide as the achene: bristles 3 or 4, white, sharply toothed, equalling the achene, or somewhat shorter.—Nees in Hook. Journ. Bot. ii. 398 (1840); Hauman & Vanderveken, Phanerog. Arg. i. 208 (1917); Barros, Ciperac. Arg. 19, t. 2, fig. 8 (1925). *E. striatula* Desv. in C. Gay, Fl. Chil. vi. 173, t. 71, fig. 3 (1853); Boeckl. Linnaea, xxxvi. 432 (1869–1870). *E. oxyneura* Durieu, Bull. Soc. Bot. France, ii. 609 (1855). *E. amphibia* Durieu, Act. Soc. Linn. Bord. xxi. 487, t. 2 (1858); C. B. Clarke, Journ. Bot. xxv. 270 (1887); Beille, Bull. Soc. Bot. France, xlix. p. xl., t. 4 (1902); Husnot, Cyperac. t. xvii. (1905–1906).—The following specimens have been seen. ARGENTINA: Pergamino, Prov. Buenos Aires, hab. in lagunas, *Parodi* 7167 (*E. bonariensis* det. Barros). CHILE: Limache prov. Valparaiso, agua del rio, *Looser* 124; Jorquera, Dept. Copiepo, Atacama, *Gijoux* in 1886; Valdivia, *O. Buchtien* in 1896 (*E. striatula* det. Buchtien). FRANCE: near Bordeaux, *E. Cosson* in 1859; vases de la Gironde submergées à chaque marée à La Bastice, vis-a-vis Bordeaux, *L. Mately* in 1860; Bordeaux, *C. J. Pittard* in 1903.

Britton, Journ. N. Y. Micr. Soc. v. 105 (1889) cites *Mueller* 1973 from Orizaba, Mexico, as this species.

According to Desvaux (l. c.) *E. striatula* differs from *E. costulata* in size and softness of the culms; the spikelets of the former are much larger, almost linear; the achenes elliptic, 1½ times larger; the style is much larger and the linear elongate anthers are twice as large. *E. amphibia* was discovered in 1851 in the environs of Bordeaux by Durieu de Maissonneuve, and in 1859 was recognized by Cosson as probably identical with *E. striatula* Desv. "This American species has been introduced by shipping" (Beille, l. c. p. xlii), and has become naturalized on the shores of the Garonne near Bordeaux. The original name, *E. oxyneura*, was changed by its author to *E. amphibia*.

Equalled in size only by *E. Wolfii*, from which it is readily distinguished by the softer culms, and by the achenes.

33. **E. Reverchonii**, n. sp. (FIG. 27), gracillima culmis capillaribus, elongatis, 8–20 cm. longis, sulcatis: spiculis 2–4 mm. longis, purpureo-brunneis, ovatis vel ovato-lanceolatis, acutis multifloris: squamis

ovatis, obtusis, purpurascentibus, in carina fuscis et in margine hyalinis; achaenio 0.5 mm. longo, obovato, basi et apice angustate longitudinaliter 9-striato, inter singulas strias transversim ca. 20-trabeculato; stylobasi conica; setis nullis.—WESTERN TEXAS: *E. Reverchon* (TYPE in Gray Herb.); in locis humidis de Goliad a Bexar, Maio 1834, *Berlandier* 2435 and 1005; San Antonio, *J. Clemens* 382 (P); Dallas, *Reverchon*, and Dalton, *Reverchon* 2451 (both at Mo. Bot. Gard.).

This species may be recognized by the long capillary culms, purple ovoid spikelets, and the minute achenes. None of the Berlandier plants have mature fruit. Reverchon's specimens at the Missouri Botanic Garden, which Dr. J. M. Greenman has kindly loaned me, are all shorter than the plant here illustrated.

34. **E. nervata**, n. sp. (FIG. 33), rhizomatibus elongatis, gracillibus, albidis; culmis non-rigidis, 3–9 cm. longis, obscure striatis angulatisque; vaginis superioribus adpressis, membranaceis et marcescentibus, flavidulis, ad apicem hyalinis; spiculis ovatis, 2–3 mm. longis, 3–5-floris; glumis ovatis, acutis vel obtusis, maturitate divergentibus, carinatis, prominenter striatis, viridibus vel interdum lateribus rufescentibus; stylo 3-fido; staminibus 3; antheris 0.7 mm. longis; achaenio 1.5 mm. longo, anguste obovato, longitudinaliter costulato, et inter singulas costas ca. 60–70-trabeculato; stylobasi conica; setis 3, achaenio vix aequilongis.—MEXICO: vicinity of Puebla, September 30, 1906, *Arsène* 217 (from which the present description is drawn); vic. of Puebla, *Arsène* 1159 (a dwarf form); San Luis Tultilanapa, Puebla, *Purpus* 3593; Orizaba, *Botteri* 771 (young specimens). ECUADOR: vicinity of Huigra, *Rose* 22415.

This species is characterized by extensive white rootstocks, few-flowered spikelets, and spreading prominently striate scales. Although the achene is of approximately the same size and shape as in *E. aciculariformis*, the plant appears distinct from that species. Much of the Mexican material which I have seen and which is possibly referable to this species, is not satisfactorily determinable due to poor material or the lack of sufficiently developed fruit, and it is probable that when a large amount of good material has been studied, the conception of the species will require modification.

35. E. COSTULATA Nees & Meyen. FIG. 28. Dwarf; culms 2–4 cm. high, rigid, striate and sulcate, sometimes recurved: sheaths scarious at the apex, dilated, often 2-lobed: spikelets 2–3 mm. long, ovate or lanceolate, 3–6-flowered: scales oblong, blunt or acute, striate, green (rarely with a brown strip on each side): style 3-fid: stamens 3; anthers about 0.5 mm. long, with a constricted apex: achenes 1 mm. long, oblong-obovate, yellowish-green, shining, triangular,

with about 12 elevated longitudinal ribs, and about 40 trabeculae in each longitudinal series: style-base narrow, conical, acute: bristles 2, white, slender, half as long as the achene, sometimes wanting.—Nees & Meyen ex Kunth, Enum. ii. 142 (1837); Desv. in C. Gay, Fl. Chil. vi. 172, t. 71, fig. 2 (1853); Boeckl. Linnaea, xxxvi. 433 (1869–1870) in part.[1] *Chaetocyperus costulatus* Nees & Meyen in Mart. Fl. Bras. ii.[1] 95 (1842) and Nees, Nov. Act. Acad. Caes. Leopold Nat. Cur. xix. Suppl. i. 96 (1843). *Scirpus costulatus* (Nees & Meyen) Kuntze, Rev. Gen. i. 757 (1891). *E. acicularis* C. B. Clarke in Engler, Bot. Jahrb. xxx. Beibl. 68: 21 (1901); Barros, Anal. Mus. Hist. Nat. Buenos Aires, xxxiv. 448, fig. 10 (1928).[2]—The following have been examined. CHILE: Raucagua, in turfosis inundatis paludosisque, *Bertero* 620 (1835); Valdivia, *Philippi* (U. S.); Bureo, *Claude Joseph* 3480 (U. S.). BOLIVIA: Mapiri, *Bang* 1503; Prov. Larecaja, vic. Sorata, alt. 3100 m., *Mandon* 1413 (not *E. nubigena* as cited by C. B. Clarke in Engler, Bot. Jahrb. xxxvii. 518 (1906)); Comarapa, Dept. Santa Cruz, alt. 2800 m., *J. Steinbach* 8521.

The type locality is in the Andes of Chile "in Cordillera de St. Fernando ad Flumen Tinguiririca . . . 3000′ altit."

Distinguished from *E. acicularis* by the dwarf, rigid, light-green culms, prominent sheaths, striate green scales, short apiculate anthers, and elevated longitudinal ribs on the achene. The style-base sometimes shows a tendency to become falcate. *E. rivularis* Phil. may be a synonym.

36. E. **stenocarpa**, n. sp. (fig. 35), rigida; culmis 6–9 cm. longis, striatis et sulcatis, glaucescentibus; vaginis in apice hyalinis, obliquis, attenuatis; spiculis 3–5 mm. longis, ovatis, acutis, 4–6-floris, glumis maturitate divergentibus; glumis viridibus, oblongis, striatis, ca. 3 mm. longis, carinatis; stylo 3-fido; staminibus 3, antheris ca. 1 mm. longis; achaenio anguste obovato, 1.5–1.8 mm. longo (cum stylobasi), flavescenti, longitudinaliter multicostato et inter singulas costas transversim ca. 60–70-trabeculato; stylobasi falcato, ca. 0.5 mm longo; setis 2 vel 3, crassis, albis, achaenium superantibus. —COLOMBIA: Dept. Santander, Rio Surata Valley above Surata, alt. 2000 ft., *Killip & Smith* 16708 (TYPE in Gray Herbarium). VENEZUELA: Merida, *Pittier* 12881 (U. S.).

[1] Boeckeler cites it from "Chili. Peruvia. Brasilia. America boreal., Boston (Greene, sub. '*Scirp. submersus*')." *Scirpus submersus* is merely a manuscript name, and the plant is presumably *E. acicularis*, with the remote possibility of its being the submersed state of *E. Robbinsii*.

[2] "In *E. aciculari* Europaea, culmi in rhizomate repente distanter fasciculati, setacei aut capillacei videntur; forma, in Chili rarior, in herb. Philippi adest. *E. costulata* (Neesii! exemplum typicum) ab exemplis debilibus *E. acicularis* Europeae nullo modo differt. In *E. costulata* Desv., culmi dense caespitosi, robustiores, glumae non maculatae; forma in Chile frequens ab Argentina usque ad Texas et Californiam sparsa."—Clarke, l. c. 22.

Most closely related to *E. costulata* from which it may be recognized by larger size, and by the larger achenes with elongated falcate beak and course elongated bristles. The Columbian *E. stenocarpa* was collected on the Eastern Cordillera, whereas *E. exigua* HBK. and *E. trichoides* HBK., closely related to *E. stenocarpa* and possibly identical with it, were collected on the Middle Cordillera.

SPECIES DOUBTFUL OR NOT SEEN

E. RIVULARIS Philippi, Linnaea, xxxiii. 270 (1864–1865). Differs from *E. striatula* Desv. in lower culms, shorter spikelets (4–7-flowered), and dark-purple scales; bristles 5–6, much longer than the achene.—At the banks of the R. Aconcagua near S. Rafael below Santa Rosa, Chile (*Philippi*).

E. EXIGUA (HBK.) R. & S. Syst. ii. 154 (1817). *Scirpus exiguus* HBK. Nov. Gen. et Sp. i. 225 (1816).

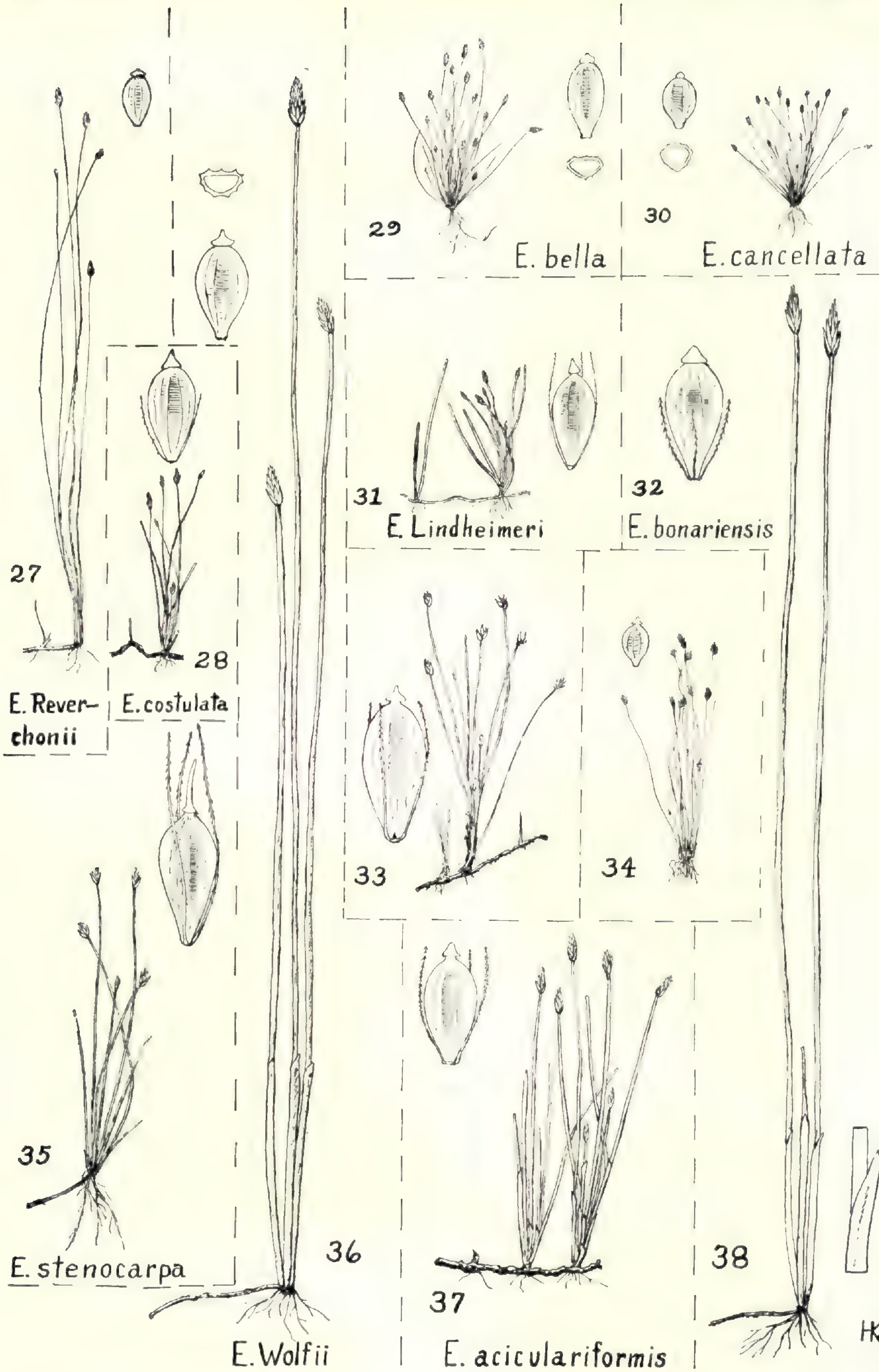
E. TRICHOIDES (HBK.) Kunth, Enum. ii. 141 (1837). *Scirpus trichoides* HBK. Nov. Gen. et Sp. i. 225 (1816), not *S. trichodes* Elliott, Sk. 76 (1816)[1] nor *S. trichodes* Muhl. Desc. Gram. 30 (1817).

E. PUSILLA R. Br. Prod. 225 (1810), and E. ATRICHA R. Br. l. c. (1810). C. B. Clarke, Kew Bull. Add. Ser. viii. 105 (1908) includes both of these under the *Aciculares*, but from the description by Mueller, Frag. Phytog. Austr. viii. 252 (1874), *E. atricha* would seem to belong to some other group.

GEOGRAPHICAL DISTRIBUTION OF SERIES ACICULARES

This series has its great development in southwestern United States, Mexico, and the Andes, where all of the species of the series are found, with the exception of the questionable *E. pusilla* R. Br. of Australia. Extending, at least in a varietal category, through nearly the whole of the United States and Canada, *E. acicularis* penetrates beyond the Arctic Circle in the Mackenzie Valley and in Greenland and spreads through a large part of Eurasia. A single specimen

[1] *Scirpus trichodes* Elliott is *E. acicularis*. A spikelet from the type has been examined through the kindness of Miss Laura M. Bragg of the Charleston Museum. Although 1821 appears on the title page of Elliott's work, the actual date of issue of the parts was earlier (See Barnhart, Bull. Torr. Bot. Club xxviii. 680 (1901)). *Scirpus trichoides* H. B. K. appeared in May, 1816; *Scirpus trichodes* was published by Elliott in September, 1816. The effective publication of *E. trichodes* Muhl. dates from 1817. Although there is a difference in spelling, both specific names are derived from the same source, and should be considered as homonyms. *Scirpus trichodes* Muhl. has been identified by Torrey, Ann. Lyc. N. Y. iii. 308 (1836) with *S. acicularis*. *S. capillaceus* Michx., "*Hab.* in nova Anglia," has been identified in the Michaux herbarium by Professor Fernald as an aquatic state of *E. acicularis*. *S. trichoides* was included by Nees in the mixed species, *Chaetocyperus polymorphus* Nees, Linnaea, ix. 289 (1834).



H. K. Svenson del.

ELEOCHARIS, SERIES ACICULARES

(Achenes × 15)

FIG. 27, E. REVERCHONII; 28, E. COSTULATA; 29, E. BELLA; 30, E. CANCELLATA; 31, E. LINDHEIMERI; 32, E. BONARIENSIS; 33, E. NERVATA; 34, E. BRACHYCARPA; 35, E. STENOCARPA; 36, E. WOLFII; 37, E. ACICULARIFORMIS; 38, E. BONARIENSIS.

which I have seen from Australia seems to be the same as the European plant, and may possibly have been introduced. *E. bonariensis*, widely distributed in South America (in Argentina and Chile), is apparently naturalized in the region of Bordeaux (as *E. amphibia*), and has a counterpart in *E. Wolfii* of the Mississippi Valley. I have seen only one specimen (*E. Lindheimeri*) of this series from the West Indies, and the group is poorly represented in, if not entirely absent from eastern South America. *E. retroflexa* (Poir.) Urban has frequently been incorrectly determined as *E. acicularis*.

Explanation of Plate 190

(Achenes × 15)

Fig. 27, Eleocharis Reverchonii, Texas, *Reverchon;* 28, E. costulata, Chile, *Bertero* 620; 29, E. bella, Washington, *Piper* 3055; 30, E. cancellata, Mexico, *Pringle* 3269; 31, E. Lindheimeri, Texas, *Lindheimer* 315; 32, E. bonariensis, Chile, *Barros* 7167 (achene); 33, E. nervata, Mexico, *Arsène* 217; 34, E. brachycarpa, Mexico, *Berlandier* 2426; 35, E. stenocarpa, Colombia, *Killip & Smith* 16,708; 36, E. Wolfii, Illinois, *Wolf;* 37, E. acicullariformis, Mexico, *Pringle* 6818; 38, E. bonariensis, Chile, *Buchtien* (habit).

Series Ovatae[1]

a. Tubercle (style-base) nearly or quite as broad as the achene; stamens 3....*b.*

b. Spikelets broadly ovoid to cylindric, obtuse to subacute; scales obtuse; tubercle depressed or deltoid, rarely ½ as high as the body of the achene....*c.*

c. Tubercle deltoid, compressed (lamelliform), the sides usually concave, ⅓–nearly ½ as high as the body of the achene; bristles (wanting in var. *Peasei*) much exceeding the achene
41. *E. obtusa.*

c. Tubercle lamelliform, very low, not more than ¼ as high as the body of the achene; summit of achene appearing truncate; bristles equaling the achene or rudimentary. 38. *E. Engelmanni.*

b. Spikelets lanceolate, acuminate; scales acute; tubercle elongate-deltoid, ½ as high as the body of the achene.....37. *E. lanceolata.*

a. Tubercle less than ⅔ as broad as the achene; stamens 2 or 3....*d.*

d. Tubercle depressed-turban-shape, broader than high; bristles wanting or rudimentary; scales greenish or dull-brown; stamens 2.....39. *E. diandra.*

d. Tubercle deltoid, higher than broad; bristles much exceeding the achene; scales purplish-brown; stamens 2 or 3.....40. *E. ovata.*

37. E. lanceolata Fernald. Culms slender, almost capillary, erect, 2 dm. high: spikelets many-flowered, 5–8 mm. long, narrowly ovate-lanceolate, acuminate; scales scarious, acute, light-brown, with a greenish midrib: achene broadly obovate, 1 mm. long, light-brown: style-base as broad as the summit of the achene, compressed, elon-

[1] Since the species of Series *Ovatae* were illustrated in Fernald, Proc. Am. Acad. xxxiv. no. 19—Contrib. Gray Herb. n. s. no. xv. (1899), it is unnecessary to illustrate them here.

gate-deltoid, half as high as the body of the achene: bristles 6–7, brown, coarse, exceeding the achene.—Proc. Amer. Acad. xxxiv. 493, figs. 27–29 (1899); Small, Fl. Se. U. S. 183 (1903). *Trichophyllum lanceolatum* House, Am. Midl. Nat. vi. 205 (1920). Arkansas: Central Arkansas, July, 1882, *F. L. Harvey* 8 (type in Gray Herb.). Texas: Texarkana, *A. A. & E. G. Heller* 4102; near Texarkana, alt. 3000 ft., *A. A. Heller* 4144 (P). This little-known species is apparently restricted to Arkansas and Texas.

38. E. Engelmanni Steud. Resembling *E. obtusa* in habit; the culms 1–4 dm. long: spikelets brownish, cylindric, 5–16 mm. long, usually acute: scales obtuse, appressed: achenes similar to those of *E. obtusa* but appearing truncate, due to the depressed tubercle not more than ¼ the height of the body of the achene: bristles about equalling the achene, retrorsely toothed.—Steud. Cyp. 79 (1855); Britton and Brown, Ill. Fl. i. 251, fig. 585 (1896); Fernald, Proc. Amer. Acad. xxxiv. 495, figs. 37–40 (1899); Robinson & Fernald in Gray, Man. ed. 7: 183, fig. 248 (1908). *E. obtusa* var. β. Torr. Ann. Lyc. N. Y. iii. 304 (1836). *E. ovata* var. *Engelmanni* Britton, Journ. N. Y. Micr. Soc. v. 103 (1889). *Trichophyllum Engelmanni* Farwell, Rep. Mich. Acad. Sci. xxi. 359 (1920).—In clay and on sandy pond-shores, rather rare, from southern Maine to Oklahoma and Missouri. Maine: exsiccated depressions in clay fields, Falmouth, *Fernald, Long & Norton* 12793. Massachusetts: Sluice Pond, Lynn, *H. A. Young* in 1880; Winter Pond, Winchester, *A. S. Pease* 11349 (N. E. B. C.); hill at Waltham, *E. Tuckerman* (N. E. B. C.); West Somerville, *C. E. Perkins* in 1881 (N. E. B. C.); Needham, *T. O. Fuller* (N. E. B. C.); pond at Mill Street, Westwood, *Wiegand & Heatley* in 1908 (N. E. B. C.); clay pit, West Barnstable, *W. P. Rich* in 1911. Rhode Island: Westerly, *Fernald & Ware* in 1919. Connecticut: West Hartford, *C. H. Bissell* in 1906; Wethersfield, *C. Wright.* New York: Cypress Hills, Long Island, *W. C. Ferguson* in 1924.[1] District of Columbia: near Deanwood, *C. F. Wheeler* in 1905; vic. of Washington, *E. S. Steele* in 1897. Virginia: Williamsburg, *E. J. Grimes* 3707. Indiana: Pilot Knob Hill, Crawford Co., *C. C. Deam* 27833. Kentucky: near Mammoth Cave, *H. K. Svenson* 163 (in part). Missouri: Genevieve, *F. P. Metcalf* 762; St. Louis, *Engelmann* in 1845 (type collection); Forest Mill, Jasper Co., *E. J. Palmer* 3770; near Asbury, Jasper Co., *E. J. Palmer* 34663 (in herb. E. J. Palmer). Oklahoma: Shawneetown, McCurtain Co., *H. W. Houghton* 3835.—Of the same general range, but apparently extending farther northward in the Mississippi Valley and southwestward to Arizona is

Forma **detonsa** (Gray), n. comb. Bristles absent or represented only by their short naked bases.—*E. Engelmanni* var. *detonsa* A. Gray in Patterson, Cat. Fl. Illinois, 46 (1876) and Bot. Gaz. iii. 81

[1] Collected by the writer, since this was in type, on serpentine barrens, Nottingham, Pennsylvania.

(1878); Fernald, Proc. Am. Acad. xxxiv. 495 (1899); Robinson & Fernald in Gray Man. ed. 7: 183 (1908).—MASSACHUSETTS: Winter Pond, Winchester, *E. H. Hitchings* in 1878, and many subsequent collections [a monstrous form with compound spikelets, *C. W. Swan* in 1884, *C. W. Jenks* in 1884].[1] PENNSYLVANIA: Conewago, *A. A. Heller* in 1901; damp sandy ground, Tinicum, Delaware Co., *A. H. Smith.* MICHIGAN: Jackson, *S. H. Camp* in 1893; Detroit, *Wm. Boott.* INDIANA: two miles north of Culver, Marshall Co., *C. C. Deam* 45400; Laporte, *E. J. Hill* in 1875. ILLINOIS: Oquawka, *Patterson* (TYPE in Gray Herb.); in a cold bog, Illinois River bottom, Peoria, *F. E. McDonald* in 1904. ARIZONA: Flagstaff, *M. E. Jones* 4058 (P).

I have seen no specimens from Nebraska and Oklahoma, but such are cited from these states by Fernald (l. c.). It has seemed desirable to reduce this to formal rank since it has no distinct geographical range.

Var. ROBUSTA Fernald. Culms stout, about 3 dm. high: the pale, oblong-lanceolate heads becoming 2 cm. long: achenes distinctly larger than in the other forms; the thicker tubercle less flattened.—Proc. Amer. Acad. xxxiv. 496, figs. 41–44 (1899).—MISSOURI: Montier, *B. F. Bush* 585. Fernald (l. c.) cites several additional specimens from Missouri, and also a collection by D. Griffiths from western South Dakota.

Var. **monticola** (Fernald), n. comb. Differs from typical *E. Engelmanni* in the pale-brown, ovate-lanceolate to oblong-lanceolate spikelets, with the less appressed scales often becoming acute.—*E. monticola* Fernald, Proc. Amer. Acad. xxxiv. 496, figs. 45–50 (1899); Piper, Contrib. U. S. Nat. Herb. xi. 160 (1906); Jepson, Fl. Calif. pt. vi. 195, fig. 15 (1922). *E. ovata* var. *Engelmanni* Britton, Journ. N. Y. Micr. Soc. v. 103 (1889) in part. *Trichophyllum monticolum* House, Am. Midl. Nat. vi. 205 (1920). *E. Engelmanni* Britton in Abrams, Ill. Fl. i. 263 (1923) in part, not as to fig. 628. *E. monticola* var. *pallida* St. John, Nw. Sci. ii. 81 (1928).—Idaho to Washington and Arizona. IDAHO: Nampa, Canyon Co., alt. 2000 ft., *Nelson & Macbride* 1061; Falk's Store, Canyon Co., alt. 2200 ft., *J. F. Macbride* 330. ARIZONA: White Mts., *D. Griffith* 5271. CALIFORNIA: Plumas Co., *Mrs. Pulsifer Ames* in 1876 (TYPE in Gray Herbarium); northern Sierra Nevada, *J. G. Lemmon* 485. OREGON: Multnomah Co., *T. J. Howell* 408; Salem, *J. C. Nelson* 1605 (resembling typical *E. Engelmanni* in its dark appressed scales); Sullivan's Gulch, Portland, *E. P. Sheldon* 10882. WASHINGTON: low muddy shores of ponds and river, near Bingen, *W. N. Suksdorf* 2583; Parker, Yakima Co., August 8, 1901, *A. D. Dunn;* Montesano,

[1] In these specimens there seems to have beeu a proliferous development of scales, with no trace of either pistils or stamens.

June 24, 1892, *L. F. Henderson;* Columbia River, W. Klickitat Co., *W. N. Suksdorf* 89.—The form with bristles lacking or rudimentary may be considered as

Var. **monticola** forma **leviseta** (Fernald), n. comb. *E. monticola* var. *leviseta* Fernald, Proc. Amer. Acad. xxxiv. 496, figs. 51, 52 (1899). —Manitoba to New Mexico and westward. Manitoba: Killarney, *Macoun* 16365. North Dakota: wet fields, Leeds, *J. Lunell* 10. Idaho: valley of Coeur d'Alene River, Kootenai Co., *Sandberg, MacDougall & Heller* 649; northern Idaho, *Sandberg* in 1892. New Mexico: Mogollon Mts., Socorro Co., alt. 8000 ft., *C. B. Metcalf* 589. California: Yosemite Valley, *Bolander* 6230, *Abrams* 4631; Prattville, alt. 4500 ft., *M. E. Jones* in 1897 (P). Washington: shore of Lake Calispell, *F. O. Kreager* 332a and 332b.

The achene of *E. monticola* is identical with that of *E. Engelmanni* and, since the two are scarcely separable in the upper Mississippi Valley and in the Southwestern States, it seems best to treat the plant of the western United States, with light-brown, ovate-lanceolate spikelets (*E. monticola*) as a variety of *E. Engelmanni.* Indeed the Patterson collection, which is the type of *E. Engelmanni* var. *detonsa*, has scales as light in color as those of *E. monticola,* and the scales are not firmly appressed. In the original description of *E. monticola* the scales were said to be darker than those of *E. Engelmanni,* but in all except one of the specimens cited they are decidedly lighter. The plants with rudimentary bristles fall naturally into the category of "forms," and since they are not geographically segregated this classification seems a proper one.

39. E. diandra C. Wright. Erect or depressed, culms 0.1–5 dm. long: sheaths usually brown at base; the apex firm: spikelet ovoid, 2–7 mm. long, many-flowered: scales membranous, somewhat spreading, ovate to ovate-oblong, obtuse, greenish or pale-brown, with a green midrib: style bifid: stamens 2: achene light-brown, obovoid or inverted-pyriform: tubercle flattened, depressed, ½ to ⅔ as wide as the achene: bristles lacking or rudimentary.—Bull. Torr. Bot. Club x. 101 (1883); Fernald, Proc. Am. Acad. xxxiv. 496, figs. 53–58 (1899); Fernald, Rhodora ii. 60, incl. var. *depressa* Fernald (1900); Robinson & Fernald in Gray, Man. ed. 7: 182, fig. 245 (1908); Long, Bartonia, 1927–1928, 40 (1929). *E. ovata* Britton, Journ. N. Y. Micr. Soc. v. 102 (1889), in part.—Maine to Pennsylvania: sandy shores or estuaries of the Androscoggin, Kennebec, Merrimac, Connecticut, Hudson, and Delaware Rivers, and on Lake Champlain, Vermont, and Oneida Lake, New York. Maine: Topsham, *C. H. Bissell* in 1911 (N. E. B. C.); Bowdoinham, *N. C. Fassett* 117 (N. E. B. C.), *Fernald & Long* 12786; Gardiner, *N. C. Fassett* 1030 (N. E. B. C.); Brunswick, *K. Furbish* in 1912 (N. E. B. C.), *C. A. Davis* in

1894. NEW HAMPSHIRE: Manchester, *F. W. Batchelder* in 1906 and 1908; Walpole, *E. Brainerd* in 1899. VERMONT: Westminster, *E. Brainerd* in 1899; Colchester, *E. Brainerd* in 1903. MASSACHUSETTS: Northampton, *E. Brainerd* in 1899. CONNECTICUT: Hartford, *C. Wright* in 1880; East Windsor, *C. H. Bissell* in 1899 and 1900; *C. H. Bissell* in Plant. Exs. Gray. 135; Wethersfield, *C. Wright* in 1880 (TYPE in Gray Herbarium); Lyme, *C. B. Graves* in 1900. NEW YORK: Lansingburgh (*E. C. Howe*, 41st Rept. N. Y. State Mus. 58 (1888)); Baker's Falls, *S. H. Burnham* (Torreya, xix. 126 (1919)); Hudson, *H. K. Svenson* in 1923; Oneida Lake, *J. V. Haberer* in 1900, *H. D. House* 2807. NEW JERSEY: Delair, Camden Co., *Van Pelt & Long* in 1907 (Bartonia 1927–28, 40 (1929)). PENNSYLVANIA: Tullytown, Bucks Co., *Long* 33492 (Bartonia, l. c.).

E. diandra was first collected by Charles Wright on the Connecticut River between Wethersford and Hartford. It is very close to *E. ovata*, from which it may be an offshoot; and, except for the lack of bristles and the marcescent character of the scales it is at times almost indistinguishable from that species. Its distribution, however, is limited to a few river systems. When diurnally submersed in estuaries the culm is erect, and both culm and scales remain green. In a collection which I made on the Hudson River under such conditions, the culms arose from successive nodes at the base, giving the effect of a rhizome. By the depressed tubercle and two stamens, *E. diandra* can be readily distinguished from the bristleless variety of *E. obtusa* which I am describing on a succeeding page. In *E. diandra*, which has two stamens, the median stamen along the outer face of the achene is missing. Dr. N. C. Fassett discusses this species in his interesting paper on the Vegetation of Estuaries, Proc. Boston Soc. Nat. Hist. xxxix. 73–130 (1928). I have not seen the specimens which I have listed from Lansingburgh and Baker's Falls, New York, nor those from New Jersey and Pennsylvania, but the records are beyond doubt.

40. E. OVATA (Roth) R. & S. In habit similar to *E. obtusa*, but usually less coarse: culms 0.3–5 dm. long: spikelet globose-ovoid to ovoid-cylindric, obtuse or acute, many-flowered, 2–8 mm. long: scales oblong to narrowly ovate, obtuse, purplish-brown, with pale midrib and base and a white scarious margin: achene obovoid or inverted-pyriform, light-brown, shining, 1 mm. long, excluding the deltoid-conic style-base, which is half as broad as the summit of the achene: bristles light-brown, 6–7, exceeding the achene.—Syst. ii. 152 (1817); C. B. Clarke, Journ. Bot. xxv. 268 (1887); Terrac. Malpighia, ii. 310 (1888); Fernald, Proc. Am. Acad. xxxiv. 494, figs. 8–10 (1889);

C. B. Clarke in Hook. f. Fl. Brit. Ind. vi. 628 (1893); Hegi, Ill. Fl. Mitteleur. ii. 39, fig. 196 (1909 ?); Rouy, Fl. France, xiii. 363 (1912). *Scirpus ovatus* Roth. Tent. Fl. Germ. ii.[2] 562 (1793) and Catal. i. 5 (1797); Aschers. & Graebn. Syn. ii.[2] 292 (1904). *S. capitatus* Schreb. Spic. Fl. Lips. 60 (1771),[1] not L. *S. compressus* Moench. Meth. 349 (1794), not Pers.[2] *S. annuus* Thuill. Fl. Paris, ed. 2: 22 (1799). *S. soloniensis* Dubois, Meth. 295 (1803). *S. nutans* Bergeret, Fl. Pyr. i. 43 (1803).[3] *S. turgidus* Pers. Syn. i. 66 (1805). *S. multicaulis* Gmel. Fl. Badens. i. 96 (1805), not Sm. *Bulbostylis ovata* Steven, Mém. Soc. Imp. Nat. Mosc. v. 355 (1813). *Clavula ovata* Dumort. Fl. Belg. 143 (1827). *Eleogenus ovatus* Nees, Linnaea, ix. 294 (1834). *Cyperus ovatus* Missbach & Krause in Sturm, Fl. Deutsch. ed. 2, ii. 25, t. 5, fig. 1 (1900). *Trichophyllum ovatum* Farwell, Rep. Mich. Acad. Sci. xxi. 358 (1920). *Eleocharis annua* House, N. Y. State Mus. Bull. no. 243–244: 58 (1923).[4] Illustrations: T. G. Nees, Gen. Fl. Germ. ii. t. 18, figs. 17–20; Fl. Dan. t. mdccci; Host. Gram. Austr. iii. t. 56; Reichb. Ic. Fl. Germ. viii. t. 295, figs. 700–701; Anderss. Cyp. Scand. t. 2, fig. 25; Fernald, Proc. Am. Acad. xxxiv. 494, figs. 8–10; Hegi, Ill. Fl. Mitteleur. ii. fig. 196; Sturm, Fl. Deutsch. ed. 2, ii. t. 5; Husnot, Cyp. t. 18; Robinson & Fernald in Gray, Man. ed. 7, fig. 246; Syreitschikov, Ill. Fl. Moscow, 170.—In North America locally from Newfoundland and eastern Quebec south to central Maine, Vermont, Connecticut and Massachusetts; also in Michigan, Wisconsin, Minnesota and Washington. Newfoundland: Rushy Pond, Valley of Exploits River, *Fernald & Wiegand* 4696. Quebec: Lac Tremblant, Terrebonne Co., *J. R. Churchill* in 1922; Black Lake, Megantic Co., *Fernald & Jackson* 12030. New Brunswick: Campbellton, *Macoun* in 1882. Maine: Fort Kent, *Fernald* in Pl. Exsicc. Gray. 55[a]; Masardis, *Fernald* 2837, 2834; Van Buren, *Fernald* in Pl. Exs. Gray. 55; Island Falls, *Fernald* 2835; St. Francis, *Fernald* 2836; Blanchard, *Fernald* 2833. Vermont: Spectacle Pond, Wallingford, *Eggleston & Ross* 638, and *Eggleston* in 1900; Abby Pond, Ripton, *Brainerd* in 1889; *Brainerd & Eggleston* 2140; Middlebury, *Brainerd* in 1878. Massachusetts: Dedham, *E. H. Hitchings* in 1878.[5] Connecticut: East Windsor, *C. H. Bissell* in 1903. Michigan: Keweenaw Co., *O. A.*

[1] I have not seen this reference.

[2] This is referred by Moench to Ehrhart, Beiträge v. 155. The correct citation is apparently Ehrhart, Beiträge iv. 155 (1789), but here Ehrhart makes no definite publication, but merely states that *Scirpus capitatus* L. (i. e. the Gronovian plant) differs from *Scirpus capitatus* of Schreber, Krocker and Roth (i. e. *Eleocharis ovata*) in that the latter is characterized by "Culmum compressum . . . . Stamina duo, und einen Stylum bifidum."

[3] Bubani, Fl. Pyr. iv. 204 (1901) refers this to *E. multicaulis*.

[4] House makes this new combination because of prior publication of *Scirpus ovatus* by Gilibert, Exercit, Phytol. (1792), which *Index Kewensis* refers to *E. palustris*. I have not seen the publication by Gilibert.

[5] This fragmentary specimen is apparently the only basis for Massachusetts. It should perhaps be referred to *E. obtusa* var. *jejuna*.

Farwell 547. WISCONSIN: Marinette, *J. H. Schuette* in 1891 and 1892. MINNESOTA: streambed 2 miles east of Fort Ripley, Crow Wing Co., *Rosendahl & Butters* 3605. WASHINGTON: "Oregon," *E. Hall* in 1871 (probably collected in Washington); springs near Vancouver Lake, *Suksdorf* 2328; muddy shores of ponds near Bingen, *Suksdorf* 2582.

The Connecticut record is based upon a single collection by Bissell, from the banks of the Connecticut River at E. Windsor in 1903. The remainder of the material which was cited by Fernald (l. c.) from eastern Massachusetts, under *E. ovata* var. *Heuseri*, is here included under *E. obtusa* var. *jejeuna*.

In Europe (the type locality is Germany) *Eleocharis ovata* is likewise scattered in occurrence. According to Ascherson & Graebner (l. c.), it is rare or scattered through the greater part of central Europe; lacking in the Netherlands, West Prussia and the Tyrol; rare in the northwest German lowlands, Mecklenburg, Pomerania, East Prussia, Switzerland and the coniferous region of the Mediterranean and not ascending more than 500 meters in the mountains. They list it also from France, Northern Italy, south and central Russia, Transcaucasia, Siberia, India, eastern Asia, North America and the Hawaiian Islands.

However, all the Hawaiian material, so far as I have come in contact with it, is *E. obtusa*. The Indian reference is based wholly upon Wallich Cat. 3487 (in part) which C. B. Clarke, Journ. Bot. l. c. queries with "an revera in India lecta." Clarke (l. c.) cites it from Java (*Zollinger*) but Koorders, Excurs, Fl. Java, i. 197 (1911), questions its presence there, and Clarke makes no further reference to it in Hook. f. Fl. Brit. Ind. Ledebour, Fl. Ross. iv. 245 (1852), cites it from central Russia (Lithuania, Kursk); Caucasian provinces (Iberia = Georgia) and Davuria (*Turcz.*). Clarke also cites it from Troy (h. Calcutta.); and by Maximowicz, Fl. Amur. 298 (1859) it is listed from several stations in Amur. *E. ovata*, cited by Hemsley, Biol. Central. Am. Bot. iii. 456 (1885), from southern Mexico, based on *Coulter* 1624, is unquestionably a different plant.

In North America *E. ovata* is rather boreal and apparently confined to calcareous regions, supplanting *E. obtusa* in the calcareous regions of Northern Maine. It has been confused with *E. obtusa*, from which it may be distinguished by the narrower achene, with its slender tubercle one-half as broad as the achene, and by the softer texture of the scales, which are usually reddish-brown.

Var. Heuseri (Uechtritz) Garcke. Plants dwarf (not exceeding 10 cm. in height), loose or spreading; culms often prostrate or arched: spikelets smaller (2–3 mm. long), deep-brown, almost spherical: scales darker with small membranous margin (= var. *minima* Beck. von Man.).—Garcke, Ill. Fl. Deutsch. Aufl. 17: 625 (1895); Fernald, Proc. Am. Acad. xxiv. 494 (1889);[1] Hegi, Ill. Fl. Mitteleur. ii. 39 (1909 ?). *Scirpus ovatus* var. *Heuseri* Uechtritz, Jahresber. Schles. Ges. Vater. Cult. 1866. *E. ovata* β *minima* Beck von Man. Fl. Nieder-Oestr. i. 126 (1890); Rouy, Fl. France, xiii. 363 (1912).

Terraciano, Malpighia, ii. 310 (1888) divides the species into α. *normalis* and β. *italica;* and under the latter describes forma *sessitensis* and var. *humifusa.*

41. E. obtusa (Willd.) Schultes. Annual, usually erect: culms numerous, 0.3–5 dm. long, yellowish-green, capillary to 1.5 mm. in diameter: sheaths purplish at base, at the apex firm and somewhat oblique: spikelets globose-ovoid to ovoid-cylindric, obtuse, many-flowered, 2–13 mm. long, closely or loosely flowered: scales ovate-oblong to suborbicular, brown, with a narrow scarious margin and usually a greenish midrib: style 3- or 2-cleft: achene 1–1.5 mm. long, turbinate-obovoid, narrowed at the base, pale- to deep-brown, smooth and shining: style-base strongly flattened, deltoid, acute, nearly as wide as the achene: bristles 6 or 7, dark brown, coarse, exceeding the achene, retrorsely toothed.—Mant. ii. 89 (1824); Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 302 (1836) excl. Syn. Gron. Fl. Virg.; Fernald, Proc. Am. Acad. xxxiv. 492, figs. 1–7 (1899); Robinson & Fernald in Gray, Man. ed. 7: 182, fig. 247 (1908); Britton & Brown, Ill. Fl. ed. 2, i. 313, fig. 766 (1913). *E. ovata* C. B. Clarke, Jour. Bot. xxv. 268 (1887) and many earlier authors, in part; Britton, Journ. N. Y. Micr. Soc. v. 102 (1889). *Scirpus obtusus* Willd. Enum. Hort. Berol. i. 76 (1809). *S. capitatus* Walt. Fl. Car. 70 (1788); Pursh, Fl. Am. Sept. i. 55 (1814); Elliott, Sk. i. 77 (1816) ?; and many other authors, not L. *S. ovatus* Pursh, Fl. Am. Sept. i. 54 (1814), not Roth. *S. elegantulus* Steud. Cyp. 317 (1855). *E. ovata* var. *obtusa* Kükenth. in Skottsberg, Medd. Göteborgs Bot. Trädgård, ii. 212 (1925–1926).

The type locality of *Eleocharis obtusa* is Pennsylvania. Abundant in muddy or wet places in eastern North America from Cape Breton and eastern New Brunswick (although lacking in the calcareous areas of northern Maine) westward to Nebraska and southward to the Gulf of Mexico, the species appears again in the Northwest, from California to British Columbia; also in the Hawaiian Islands. The

[1] Prof. Fernald informs me that he now considers the American plants which he has so named merely trivial forms, which probably do not represent var. *Heuseri* of Europe.

citation from Australia by Mueller is to be referred to *E. cylindrostachys* Benth. & Mueller, Fl. Austr. vii. 294 (1878).

From a very abundant representation the following are cited as typical. QUEBEC: Lac William, Megantic Co., *Victorin* 11296 (bristles rudimentary); Massauwippi R., Sherbrooke Co., *C. H. Knowlton* in 1923; Dudswell, Wolfe Co., *C. H. Knowlton* in 1923; Longueuil, *Victorin* 1036; North Wakefield, *Macoun* in 1893. PRINCE EDWARD ISLAND: Tignish, *Fernald, Long & St. John* 6951. NEW BRUNSWICK: Bathurst, *S. F. Blake* 5468. NOVA SCOTIA: Sydney, Cape Breton Island, *Fernald* in 1902; and many collections thence south to SOUTH CAROLINA: Charleston, *B. L. Robinson* 257. GEORGIA: Augusta, *J. Metcalf* 104; Stone Mt., *Munz* 1339 (P); Athens, *R. M. Harper* 11. FLORIDA: *Chapman* (without locality). MISSISSIPPI: Saratoga, *S. M. Tracy* 8662. LOUISIANA: New Orleans, *Drummond* 405 (type of *S. elegantulus*). West to ONTARIO: Ottawa, *Macoun* 86,439. MICHIGAN: Menominee, *Schuette* in 1891. WISCONSIN: St. Croix Co., *T. J. Hale* in 1861. MINNESOTA: St. Paul, *Rosendahl* in 1917. IOWA: Grinnell, *M. E. Jones* in 1877 (P). NEBRASKA: Nemaha, *J. M. Bates* 5298. OKLAHOMA: Tonkawa, Kay Co., *Stevens* 1888. KANSAS: Pottawatomie Co., *J. B. Norton* 545. COLORADO: Platte River, south of Englewood, alt. 5300 ft., *I. W. Clokey* 3297. IDAHO: Coeur d'Alene Riv., Kootenay Co., *Sandberg, MacDougall & Heller* 649 (P). OREGON: Lakeside, Coss Co., *Peck* 9012; Columbia Riv., Hood Co., *Henderson* 966 in 1924; Eagle Creek, Clackamas Co., *Abrams* 8802 (P); Portland, *E. P. Sheldon* 10882 (P); Clackamas, *Elmer* 1610 (P). WASHINGTON: Green Lake, Seattle, *Congdon* in 1903; Waitsburg, *R. M. Horner* 510 in 1897; Manor, Clarke Co., *Piper* 3076; Montesano, Chehalis Co., *Heller* 4073 (G, P); Olympia, *Abrams* 9286 (P). BRITISH COLUMBIA: Chilliwack Valley, *Macoun* 34772. HAWAIIAN ISLANDS: Kauai, *A. A. Heller* 2488; Oatui, *Remy* 128; *Seemann* 1708; *Mann & Brigham* 27.

Var. JEJUNA Fernald. Culms capillary, suberect or generally decumbent or spreading, 1 (rarely 2) dm. or less high: heads smaller, fewer-flowered, 2–5 mm. long: scales more spreading, membranous, often tinged with purple: achene somewhat smaller, obovate, with the tubercle about three-sevenths its height.—Proc. Am. Acad. xxxiv. 492, figs. 13, 14 (1899). *E. ovata* var. *Heuseri* Fernald (l. c.) in part.—The following specimens may be included under this variety; although there is a considerable amount of variation and transition to the typical form. NOVA SCOTIA: peaty and muddy dried-out pond-hole, Springhaven, Yarmouth Co., *Fernald & Linder* 20131. MAINE: Milo Junction, *Fernald* 2838; North Berwick, *Fernald* in 1897 (TYPE in Gray Herb.). NEW HAMPSHIRE: Hampton, *E. F. Williams* in 1901; Lebanon, *G. G. Kennedy* in 1890. VERMONT: Westminster, *Brainerd* in 1899. MASSACHUSETTS: in black mud near Winter Pond, *G. G. Kennedy* 9; muddy margin of pond, Purga-

tory Swamp, Norwood, *Fernald, Floyd & Robinson* in Plant. Exsicc. Gray, 138 "spikes more elongated and tubercle narrower than in the extreme form of the species" (transition to typical *E. obtusa*); bog, south of Annursnack Hill, Concord, *E. F. Williams* in 1897; White Pond, Maynard, *C. A. Weatherby* 2843. Rhode Island: Clay Head, Block Island, *Fernald, Long & Torrey* 8882. Connecticut: East Windsor, *C. H. Bissell* 888; Griswold, *C. B. Graves* 281.

This variety seems to be an ecological phase which occurs when the plant is growing in muddy inundated places, and, except for the accompanying change in the character of the achene, should have been inclined to omit it from consideration. The extreme is reached in a plant collected by Prof. Fernald and myself in a dried out mill-pond at Weymouth, Massachusetts, Oct. 9, 1928 (to be issued in *Plantae Exsiccatae Grayanae*). The erect capillary culms of the Weymouth plant are 4–10 cm. high and form a turf covering the entire muddy bottom; the elliptic to ovate spikelets are 2–3 mm. long, 6–10-flowered; the appressed-ascending scales are rather membranous, green, with dusky-purple sides and scarious margins; the obovate achenes are only 1 mm. long, pale green to light brown, strongly biconvex (approaching orbicular in cross-section), with a greenish acute tubercle as wide as the achene and nearly half as high. On a second visit to this locality the mill-pond was found to be filled with water; and it appears that there is a weekly fluctuation of the exsiccated and submerged conditions. Although at first sight appearing like a distinct species, the Weymouth plant is approached by some other collections from eastern Massachusetts, notably *C. A. Weatherby* 2843 and *E. F. Williams*, Annursnack Hill, Concord. Some of the specimens cited from northern New England closely approach *E. ovata*.

Var. gigantea (Clarke) Fernald. Culms stout and tall, 5–8 dm. high: spikelets ovate-oblong, 9 or 10 mm. long, 5 mm. broad: scales ovate, dark-brown; achenes as large as in the species; the broad obcordate tubercle not depressed, about five-eighths as high as the achene.—Proc. Am. Acad. xxxiv. 493, figs. 11, 12 (1899). *E. ovata* var. *gigantea* C. B. Clarke in Britton, Journ. N. Y. Micr. Soc. v. 103 (1889) *nomen nudum; E. obtusa* Watson, Bot. Calif. ii. 222 (1880) in part, not Schultes.—Washington: Cascade Mts., "Oregon," 49° N. Lat. *Lyell* in 1859. British Columbia: New Westminster, *Macoun* 7557.

This variety was founded by C. B. Clarke on a very large specimen of *E. obtusa* (*Lyell*, Cascade Mts.), the culms of which are over 7 dm.

long. This is approximately twice the size of any other specimen that I have seen from the Pacific Coast. *Macoun* 7557 (of which only the upper portions of a few culms are represented in the Gray Herbarium) has heads as large and culms as stout as in the Lyell plant, and may approach it in size. There is a tendency in *E. obtusa* from the Pacific States to have somewhat larger, darker spikelets than material from the East and the tubercles tend to be larger and higher than in the eastern plant, thus approaching var. *gigantea*. This is true for practically all the specimens from the Pacific States; but, on the other hand, there are all sorts of gradations to the typical form, and scattered throughout the eastern and central states we may find plants with spikelets equally as large as those of the Pacific States. In a widespread annual species, such as *E. obtusa*, many local tendencies to slight variation occur, and the writer does not feel that all of these numerous and complex variations can be definitely set apart.

Var. **Peasei**, n. var., setis nullis.—This variety occurs on the sandy shores of ponds in New Hampshire, Maine, and in Quebec, and has previously been identified either as *E. Engelmanni* or as *E. diandra*. Three stamens are always present, and the tubercle is of the typical form found in *E. obtusa*. NEW HAMPSHIRE: wet sandy shore, Ossipee Lake, Ossipee, Aug. 23, 1923, *A. S. Pease* 19233. (This may be considered as the TYPE in Gray Herb.), 19236 (N. E. B. C.) and Aug. 10, 1921, 18107 (N. E. B. C.). MAINE: damp sandy beach, Lovewell Pond, Fryeburg, Aug. 17, 1927, *A. S. Pease* 17901 (N. E. B. C.). QUEBEC: Ste. Anne de Beaupré, *Macoun* 69304.

Some of these plants show the remarkable phenomenon of developing leafy appendages from the apices of the upper sheaths. These are best developed in the plants with capillary culms, and reach their finest development in *Macoun* 69304, where many of the sheaths have foliar extensions 1 cm. in length. These seem to be in the nature of true leaves, flattened for a short distance from the culm, and then becoming cylindrical by inrolling. Absence of leaves is one of the generic characters of *Eleocharis*, and it is the more remarkable to find such a condition, supposedly atavistic, occurring toward the northern outpost of an annual species, in which, moreover, the perianth is deficient. However, in plants collected by Ezra Brainerd, in a "dried-up swale at Knights Island, Vermont," we have the same capillary aspect of the culms and, to a lesser extent, the presence of foliaceous sheaths, but the achenes are, as in typical *E. obtusa*,

equipped with bristles exceeding the achenes. What I have considered as the type of *E. obtusa* var. *Peasei* (*Pease* 19233) has thickened culms like typical *E. obtusa* and the sheaths merely end in a mucro less than a millimeter in length. However, there are gradations to plants with capillary culms (*Pease* 17901 and 19236) which show well developed foliaceous sheaths.

Var. **ellipsoidalis** Fernald, n. var. in herb., culmis saepe inaequalibus; spiculis ellipsoidalibus; squamis valde adpressis.—Eastern Massachusetts to Virginia, on the coastal plain. Massachusetts: Great Pond, Weymouth, *G. G. Kennedy* in 1908; Hawk's Nest Pond, Harwich, *Fernald* 16306 and 16307; Great Sandy Pond, Pembroke, *St. John & Hunnewell* in 1916 (N. E. B. C.); Shallow Pond, Falmouth, *Fernald & Long* 18021 (type in Gray Herb.); Crooked Pond, Falmouth, *Fernald & Long* 18020; Sparrow Young's Pond, Chatham, *Fernald* 16308; Cole's Pond, East Dennis, *Fernald & Long* 18018; Upper Simmons Pond, Dennis, *Fernald & Long* 16309; Cliff Pond, Brewster, *Fernald & Long* 16310; Buck Pond, Harwich, *Fernald & Long* 16311; Half-way Pond, Barnstable, *Fernald & Long* 16312; No-Bottom Pond, Brewster, *Fernald & Long* 16313; Griffith's Pond, Brewster, *Fernald* 16314. Rhode Island: Beach Pond, Exeter, *Collins & Fernald* 11297; Long Pond, South Kingston, *Collins & Fernald* 11298; Little Sandy Pond, Warwick, *Collins, Fernald & York* 11299. New Jersey: Quaker Bridge, *C. F. Austin* in 1845; Winslow Junction, *Gershoy* 141[a]. Delaware: Greenbank, *Commons* in 1881; Centreville, *Commons* in 1864. Virginia: East Williamsburg, *E. J. Grimes* 3709.

This variety has been noted by Prof. Fernald for many years, and is found in quagmires at the borders of ponds on the coastal plain. It is recognized by the ellipsoid spikelet, ascending lower bracts and closely appressed scales, and somewhat sprawling habit.

Several other variations have come to hand in this complex species. Among them is a plant resembling *E. obtusa* var. *jejuna* in habit but with straw-colored scales, *C. C. Deam* 45541, Bloomington, Indiana. The bristles are rather weak, usually only 4 or 5. Material collected by *D. Pretz*, Bristol, Bucks Co., Pennsylvania in 1886, has loose spikelets and the achenes have 2–4 bristles. Specimens collected by *Holm*, Bunker Hill Road, D. C., September 1, 1915, have capillary culms and loose-flowered spikelets.

Geographical Distribution of Series Ovatae

A small series of five annual species, chiefly in North America. *E. ovata*, of scattered distribution from the Amur westward into

Europe but lacking in large areas, appears very locally in calcareous regions of North America from Newfoundland westward to Oregon and Washington. *E. obtusa*, a ubiquitous species of muddy places in the eastern United States, except in the sandy coastal region of the Southeast, extends westward to the Great Plains, and reappears in the Pacific region from northern California to British Columbia and in the Hawaiian Islands. *E. Engelmanni*, having in general a similar range, but tending to be somewhat more southern, and lacking in the Hawaiian Islands, appears here and there, chiefly in clay deposits. *E. diandra* and *E. lanceolata* are localized; the former on the sandy or muddy shores of a few rivers in northeastern United States; the latter confined to a small area in Texas and Arkansas. This northern series seems most closely related to series *Maculosae*, subseries *Rigidae*, comprising the often tropical *E. caribaea* and *E. atropurpurea*, from which it consistently differs in the color of the achenes and the character of the style-base.

(To be continued)

ACHILLEA SIBIRICA IN EASTERN AMERICA. In a collection of plants brought back in July, 1928 by Mr. K. P. Jansson from the valley of the Ste. Anne des Monts, Gaspé Co., Quebec and referred to me for identification, there was a plant of unusual interest, a species of *Achillea* having linear pectinate-pinnatifid leaves and found in a meadow along the river. Comparison at once shows it to be *A. multiflora* Hook. Fl. Bor.-Am. i. 318 (1833), treated by Gray, Syn. Fl. N. A. i.[2] 363, as an endemic American species with a range from "Saskatchewan to Fort Franklin and Behring Strait"; likewise treated by Rydberg, N. A. Fl. xxiv.[3] 226, as strictly American: "Manitoba to Alaska, and the Arctic coast." The statement of Gray that *A. multiflora* reaches Bering Strait and the occurrence in the Gray Herbarium of a specimen from Bering Island (near Kamchatka), validated by Gray in the preparation of the Synoptical Flora, have led me to look into the Asiatic material; and there I find many sheets of the variable *A. sibirica* Ledeb. Ind. Sem. Hort. Dorpot (1811) which in their variations closely match the American species. In fact, Ledebour, himself, Fl. Ross. ii. 528, recognized *A. sibirica* (as *Ptarmica sibirica*) as extending by way of Kamchatka to Alaska; but American botanists seem to have overlooked the identity. In

the American series the ligules are usually short, in the Asiatic often longer, but sheets from Corea, Amur and Manchuria have them as small as in any of the American plants; and a sheet from Ussuri, sent out by Regel as his var. *typica*, so closely matches the collections from the Saskatchewan plains that one could easily imagine that they came from one colony. The northwestern American *A. multiflora* should, then, be treated as *A. sibirica* Lædeb. (*A. mongolica* Fischer); and its discovery by Mr. Jansson in Gaspé adds another to the long list of Siberian-West American species isolated about the Gulf of St. Lawrence.—M. L. Fernald, Gray Herbarium.

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A SOUTHERN OUTPOST FOR POTENTILLA TRIDENTATA

Roland M. Harper

In September, 1898, the writer found *Potentilla tridentata* Ait. (*Sibbaldiopsis tridentata* Rydb.) on the summits of Wachusett and Little Wachusett Mountains in Worcester County, Massachusetts, the latter station, with an altitude of only 1560 feet, being a rather low record for it, for latitude and altitude combined; and it was so reported in Rhodora (1: 90–91) for May, 1899.

Although I had been on top of several of the higher mountains of southern New England, southern New York, New Jersey and western North Carolina in the meanwhile, I do not recall meeting this characteristic mountain plant again, outside of cultivation,[1] for more than thirty years. On Oct. 14, 1928, I climbed Blood Mountain, in the southern edge of Union County, Georgia, in latitude 34° 44′, and found this species fairly common in crevices of rocks at the summit, 4463 feet above sea-level according to the topographic maps. The rock was not studied scientifically, but is highly siliceous, as on most other mountain summits in the South, of whatever geological age. As there are no higher peaks anywhere farther south in the eastern United States, it may be that this is the extreme southern limit of the species.

The trees near the summit are very stunted, on account of the cold winds and ice storms in winter, thin soil, and perhaps other

[1] On March 16, 1915, I saw it in a most unexpected place, namely, in a rock garden on a new private estate in Sebring, Florida, in latitude 27° 30′ (less than 300 miles from the Tropic of Cancer). I did not visit Sebring again for several years, and by that time the town had grown so prodigiously that I could not identify the spot; and I never learned whether the *Potentilla* survived the summers there.

factors, and an acre or two at the summit is practically treeless, affording an unobstructed view in all directions.

The most intimate associate of the *Potentilla* there was *Paronychia argyrocoma*, another characteristic plant of mountain summits from Virginia to Georgia.

Other plants noted in the immediate vicinity (listing them in approximate order of size) were *Castanea dentata*, *Quercus alba*, *Robinia Pseudo-acacia*, *Amelanchier* sp., *Kalmia latifolia*, *Hamamelis Virginiana*, *Rhododendron maximum*, *Corylus* sp., *Salix humilis*, *Diervilla trifida*, *Andropogon scoparius*, *Polypodium vulgare*, *Selaginella rupestris*, a moss, *Polytrichum* sp., and a lichen, *Umbilicaria* sp. (All but one or two of these are common also in New England.) *Juncus tenuis* grew along the path, as it does in innumerable other places in the eastern United States.

It so happens that just before my visit a two-mile foot trail had been completed from the summit of Blood Mountain to Neel's Gap (3108 feet above sea-level), the nearest point on the Appalachian Scenic Highway, a new paved road (said to extend from the St. Lawrence to the Gulf), already much frequented by tourists; and other visitors than myself and companions were taking advantage of the trail on that beautiful autumn day. Worse still, it is planned to erect a stone observation tower on the summit of the mountain in the near future. The stone for it will naturally be taken from the immediate vicinity, with more or less damage to the *Potentilla* and other rock-loving plants, and the inevitable increase in number of visitors is bound to cause still further damage to the vegetation (even though the *Potentilla* offers little attraction to flower-picking vandals), and the introduction of more weeds.[1]

All this is in line with a nation-wide movement in recent years to make places of scenic and scientific interest more accessible to thoughtless hordes of pleasure-seekers, to whom the scientific features mean nothing, or less than nothing. Several such places have already been made national or state parks (the spot in question, with two acres surrounding the summit, is Georgia's first state park), and when that is done many people who never gave it a thought before seem to be seized with a desire to go and trample over the landscape

[1] Since this went into type an article by Raymond H. Torrey, in Torreya, **29**: 72, 73, emphasizes the danger of destruction of the only New Jersey station (High Point on Kittatiny Mountain) for *Potentilla tridentata* through a similar erection of a monument, without any apparent thought that in the process one of Nature's monuments is being destroyed.

or commit other depredations, and considerable damage has already been done in that way in other states, it is said.

It is a debatable question whether such interesting places would better be left to the chance of falling a prey to the exploiters of stone, timber, etc. (some of them have nothing of imaginable economic value anyway), and let scientists and nature-lovers endure a few hardships to reach them, or be made more accessible and attractive to the masses as well as to scientists, with inevitable progressive deterioration. The average person does not grasp the distinction between a state or national park, designed to preserve natural conditions, and a city park, which is purely ornamental and recreational; and the tendency is to obliterate such distinctions.[1] Even if the possibility of vandalism and other damage could be eliminated by constant patrolling, a botanist would not get much satisfaction from following a beaten path, where he knew that several others had preceded him and recorded everything worth observing.

Athens, Georgia.

Another Station for Cypripedium arietinum in Massachusetts.—On June 5th, 1928, Rev. Frank C. Seymour, of North Amherst and R. A. Clark of Springfield, Massachusetts, found on the western slope of Wilbraham Mt., between Wilbraham and North Wilbraham, three plants of *Cypripedium arietinum*. Two of the plants had been in flower but were past, as the flowering season is some two weeks earlier.

May 26 of this year [1929] the spot was again visited by Dr. Walter H. Chapin of Springfield and Miss Fannie A. Stebbins, retired Nature Supervisor of the Springfield Schools, in company with R. A. Clark. Again the three plants were found, two of them in fine flower. Plants and flowers were left intact. Diligent search revealed no other plants. No other record is known of this rare orchid in this region.

The writer has visited Mt. Toby in the town of Sunderland for many years in the last of May, seeing each year from 30 to 50 of these coy flowers. This year 31 blossoms were found, including one splendid colony of eight flowers.—R. A. Clark, Springfield, Massachusetts.

[1] In this connection see Charles C. Adams, The importance of preserving wilderness conditions. (In 22nd Report of the Director) N. Y. State Mus. Bull. 279: 37–46, figs. 6–9. 1929.

MONOGRAPHIC STUDIES IN THE GENUS ELEOCHARIS

H. K. Svenson

(*continued from page 219*)

Series Maculosae

(Plate 191)

a. Sheaths firm at the apex; achenes black or purplish-brown. Sub-series: Rigidae....*b*.
b. Achenes 0.7–1 mm. long ....*c*.
c. Achenes 1 mm. long; spikelets many-flowered, globose to ovoid; scales usually firm; culms 0.3–4 dm. high (widespread in warm or tropical regions).....42. ***E. caribaea.***
c. Achenes 0.7 mm. long; tubercle depressed, ½ as broad as the achene; spikelets ovoid, 10–20-flowered; scales thin; plants dwarf, 4–10 cm. high (Texas).....46. ***E. microformis.***
b. Achenes 0.5 mm. long....*d*.
d. Spikelets elongated, 2–8 mm. long, many-flowered; bristles translucent, much shorter than the achene; achene broadest at summit.....43. ***E. atropurpurea.***
d. Spikelets not elongated; bristles opaque; achenes broadest below the summit....*e*.
e. Spikelets 2–3 mm. long, 5–15-flowered; culms 4–12 cm. long; bristles dull-brown to white, obscurely toothed; tubercle less than ⅓ as broad as the achene (Fla., W. Ind.) 44. ***E. praticola.***
e. Spikelets 1–2 mm. long, 3–9-flowered; culms 2–5 cm. long; bristles white, retrorsely toothed; tubercle ⅔ the width of the achene (Bahama Ids.).....45. ***E. bahamensis.***
a. Sheaths membranous at the apex. Sub-series: Ocreatae....*f*.
f. Mature achene olivaceous....*g*.
g. Spikelets much thicker than the culms; bristles longer than to slightly shorter than achene....*h*.
h. Tubercle elongated; surface of achene smooth or punctulate; culms 2–15 cm. long (rarely longer) (E. U. S. and Can.) 47. ***E. olivacea.***
h. Tubercle not elongated....*i*.
i. Culms 12–26 cm. long; scales linear; surface of achene obscurely striate (Galapagos Ids.).....48. ***E. galapagensis.***
i. Culms 3–5 cm. long; scales broadly ovate; surface of achene with elongate black striations (Mex.).49. ***E. Schaffneri.***
g. Spikelets of same diameter as the thickened culm; bristles glistening-white, shorter than achene (Brazil and Paraguay) 50. ***E. Sellowiana.***
f. Mature achenes black or deep-brown....*j*.
j. Spikelets 1–3-flowered; culms 1–4 cm. high (Trop. So. Am.) 51. ***E. capillacea.***
j. Spikelets many-flowered....*k*.
k. Scales appressed....*l*.
l. Scales yellow or greenish, not prominently keeled; achenes 0.8 mm. long; bristles shining-white, shorter than the achene (Trop. and subtrop. regions).....52. ***E. flaccida.***
l. Scales purplish-brown, the lowest prominently keeled; achenes 1.3–1.5 mm. long, including the style-base; bristles reddish-brown, often longer than the achene (W. Ind. and So. Am.).....53. ***E. maculosa.***

k. Scales somewhat spreading, strongly keeled.....*m.*
m. Spikelet about 5-flowered (Afr.).....54. *E. intricata.*
m. Spikelet 10–15-flowered (Brazil).....55. *E. debilis.*

Sub-series Rigidae

42. E. caribaea (Rottb.) Blake. Fig. 48. Cespitose: culms firm, 0.3–4 dm. high, striate and sulcate: sheaths prominent, stramineous, usually with a brown base and with firm, oblique, often attenuate apex: spikelets subglobose or ovoid, obtuse, many-flowered: scales ovate-orbicular, almost cartilaginous to membranous, yellow to pale-brown: style bifid: stamens 2 or 3: achene obovoid, 1 mm. long, lustrous-black; the spongy, whitened style-base variable in shape but usually much depressed: bristles 6–8, coarse, brown, exceeding the achene or occasionally lacking.—Rhodora, xx. 24 (1918); Merrill, Enum. Phil. Pl. i. 119 (1922). *Scirpus caribaeus* Rottb. Descr. Pl. Rar. Progr. 24 (1772) and Descr. Ic. Nov. Pl. 46, t. 15, fig. 3 (1773), ed. 2, 46, t. 15, fig. 3 (1786). *Scirpus capitatus* Willd. Sp. Pl. i. 294 (1798) in part; HBK. Nov. Gen. et Sp. i. 225 (1816). *E. capitata* R. Br. Prod. 225 (1810);[1] Torr. Ann. Lyc. N. Y. iii. 305 (1836); Boeckl. Linnaea, xxxvi. 461 (1869–70); Bentham & Mueller, Fl. Austr. vii. 296 (1878); Britton, Journ. N. Y. Micr. Soc. v. 102 (1889); C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 627 (1893), in Durand & Schinz, Consp. Fl. Afr. v. 597 (1895) and in Urban, Symb. Ant. ii. 66 (1900); Britton and Brown, Ill. Fl. ed. 2. i. 313, fig. 764 (1913); Jepson, Fl. Cal. vi. 194 (1922); Barros, Anal. Mus. Nat. Hist. Buenos Aires, xxxiv. 400, fig. 6 (1928). *E. setacea* R. Br. Prod. 225 (1810).[2] *Eleogenus capitatus* Nees in Wight, Contr. Bot. Ind. 112 (1834). *Chlorocharis capitata* Rikli in Pringsh. Jahrb. xxvii. 564 (1895).—In ditches, marshes, and on banks of streams from "Maryland"[3] and South Carolina to Florida, westward to Texas and California, and southward through tropical America to Peru, Paraguay and southern Brazil. Also common in the tropics of the Old World. Specimens examined: South Carolina: Sullivan Island, *Gibbes*. Florida: Crescent Lake, St. Johns Co., *R. M. Harper* 41; Dade Co., *A. A. Eaton* 14; Miami, *Garber* in 1877; Key West; Blodgett. Texas: *Berlandier* 680, 2090; Sabinal, *C. Wright* 1933; Rio Grande, *C. Wright* in 1848; East of Rio Grande, *Rose & Russell* 24359; Sutherland Springs,

[1] To quote from Blake (l.c.) "The name *Eleocharis capitata* (L.) R. Br. . . . . has a somewhat peculiar status. It was based on 'Scirpus capitatus Linn. sp. pl. ed. Willd. 1. p. 294,' but was expressly distinguished from the Gronovian plant, which of course Brown had examined, the type of *S. capitatus* L. Since, however, Willdenow's *S. capitatus* is based directly on Linnaeus's, the application of Brown's name must be determined by the Clayton plant on which rests the name-bringing synonymy of Linnaeus. The name Eleocharis capitata (L.) R.Br. must therefore now be restricted to the plant which has long been called *Eleocharis tenuis* (Willd.) Schultes."

[2] Benth. & Mueller (l.c.) reduce this to synonymy under *E. capitata* (i. e. *E. caribaea*).

[3] In Gray's Man. ed. 7 and Britton and Brown, Ill. Fl. ed. 2, the range is given from Maryland to Florida, etc. but there are no specimens from north of South Carolina in the Gray Herbarium nor at the New York Botanical Garden.

Wilson Co., *Palmer* 1328; Liberty Co., *C. Wright;* Western Texas to El Paso, *C. Wright* 711; Rio Coleto, *G. Thurber* in 1850. CALIFORNIA: San Bernardino, *S. B. & W. F. Parish* 1160, *S. B. Parish* 5277; Palm Canyon, Riverside Co., *I. M. Johnston* in 1917 and *F. W. Peirson* 5408. BERMUDA: Paget Marsh, *Britton & Brown* 215; Shelly Bay, *Harshberger* in 1905; *D. W. Fellows* 123; Pembroke Marshes, *A. H. Moore* 3164. BAHAMA ISLANDS: Andros, *A. E. Wight* 267; New Providence, *Britton & Brace* 501; Nassau, *Curtiss* 163. CUBA: *C. Wright* 712; Santa Clara, *Britton, Britton & Cowell* 10212; Isle of Pines, *Britton, Britton & Wilson* 14961, 14622; Santa Clara, *Ekman* 17128; Oriente, *Ekman* 6180; Havana, *Ekman* 897; Santa Clara, dist. Cienfuegos, *Combs* 626. PORTO RICO: *Sintenis* 1219, 5617; *A. A. Heller* 6412; San Juan, *Hioram* in 1913. VIRGIN ISLANDS: Purcells, *W. C. Fishlock* 312. JAMAICA: St. Thomas, *Harris* 12283; vic. of Windsor, *Maxon & Killip* 266. HAITI: Etang Saumatre, *E. C. Leonard* 3478, 3525; St. Michel de l'Atalaye, *E. C. Leonard* 7033; vic. of Petionville, *E. C. Leonard* 5087. GUADELOUPE: *Père Duss* 3910, 3126. TRINIDAD: *Britton, Hazen & Mendelson* 1654. GRENADA: Carriscon, *Broadway* in 1898. CURAÇAO: *Currie & Haman* 186. ST. THOMAS: *Eggers* 81. ST. JAN: *Eggers* in 1877. MARGARITA: *J. R. Johnston* 204; *Miller & Johnston* 191 (G, P). MEXICO: Antiqua, Vera Cruz, *Purpus* 6249; Monterey, *Arsène* 6223; Victoria, Tamaulipas, *Palmer* 449; Guerrero, *Langlassé* 124; Hacienda de Angostura, *Pringle* 3812; Guaymas, *Palmer* 635 and 635½; Para del Correo, *Liebmann;* Salina Cruz, *C. C. Deam* 105; Izamal, Yucatan, *Gaumer* 424. GUATEMALA: Dept. Baja Verapaz, *Tuerckheim* (S); Gualan, *S. F. Blake* 7675; Lake Izabal, *S. F. Blake* 7832; Laguna de Amatitlan, *Pittier* 117; Gualan, *C. C. Deam* 433. SALVADOR: Mahulingo, *Standley* 22032; San Vincente, *Standley* 21180. VENEZUELA: La Ceiba, *Pittier* 10882. COLOMBIA: Villavicencia, *F. W. Pennell* 1530; Dept. of Santander, *F. W. Pennell* 3845; Santa Marta, *H. H. Smith* 238; vic. of Cucuta, Dept. Santander, *Killip & Smith* 20975. BOLIVIA: Rio Perdix, Prov. Sara, Dept. Santa Cruz, *J. Steinbach* 7454. ECUADOR: Catamayo, *André* 4392. PERU: U. S. Exploring Expedition prope Tarapoto; *Spruce* 4190. FRENCH GUIANA: *Jelski* 1867 (Ph.). BRAZIL: Bahia, *Salzmann* in 1840; Rio de Janeiro, *Glaziou* 1293; Pernambuco, *Gardner* 1203 (G, S.). PARAGUAY: Ipacaray, *Hassler* 12658. AFRICA: Senegal, *Laprieur* in 1827; West. Trop. Africa, *G. Mann* 891 (in part); Socotra, *Balfour* 730. INDIA: Behar, *Hooker;* Bengal, *Wallich* 3486e, *Griffith;* Peninsula Ind. orientalis, *Wight* 1899; Ceylon, *Thwaites* 3039. CHINA: Hong Kong, *C. Wright* 593. PHILIPPINE ISLANDS: Manila, *E. D. Merrill* 55; vic. Manila, *Wilkes Expl. Exped.;* Manila, *R. C. McGregor* in Kneucker, Cyp. et Junc. Exsicc. 227. FIJI ISLANDS: Tahiti, *Leland, Chase & Tilden* 3; dripping rocks, base of maritime cliffs, Tahiti, *Setchell & Parks* 269. AUSTRALIA: Victoria River, *F. Mueller.*

There is some variation in this species. I have seen bristleless

specimens from Bahia (*Salzmann*) and Senegal (*Laprieur*). The style-base in some of the Indian and Chinese material is not depressed and some of the specimens from Tahiti tend to have lax scales. *E. caribaea* is apparently a common tropical species, and seems related to *E. atropurpurea*. Some of the material from eastern Brazil, especially in the region of Rio de Janeiro, is characterized by soft membranous scales. A recent collection from dripping sea cliffs at Avenida Niemeyer, Rio de Janeiro, *L. B. Smith* 1298, has lax roseate scales and at first sight the appearance of a distinct species.

Var. DISPAR (E. J. Hill) Blake. Scales purple-brown: achenes purple-black.—RHODORA xx. 24 (1918). *E. dispar* E. J. Hill, Bot. Gaz. vii. 3 (1882). *E. capitata* var. *dispar* Fernald, RHODORA viii. 129 (1906).—Known only from Lake County, INDIANA: Whiting, *E. J. Hill* in 1881, no. 192 in 1898; Wolf Lake, Whiting, *Agnes Chase* in 1897.

This variety is isolated in the sandy region near Lake Michigan, while the typical form is on the coastal plain. Peattie, RHODORA xxiv. 57–70, 80–88 (1922) has discussed in detail the presence of this and other coastal plain plants in the sand dunes of Lake Michigan.

43. E. ATROPURPUREA (Retz.) Kunth. FIG. 49. Dwarf annual, caespitose: culms 3–12 cm. high, capillary, erect or arcuate: sheaths deep-brown at base; the firm apex oblique and often attenuate: spikelet oblong-ovoid, 2–8 mm. long; the lower scales frequently deciduous: scales ovate, membranous, blunt, with broad green midrib and deep brown sides: style 2-fid: stamens 1–3: achenes strongly flattened, lenticular, obovoid, widest at the summit, 0.5 mm. long, smooth, lustrous-black: style-base minute, flattened, about ¼ the width of the achene: bristles slender, translucent, shorter than the achene, often reduced or wanting.—Kunth. Enum. ii. 151 (1837); J. Gay, Flora, xxv. 641–646 (1842); Boeckl. Linnaea, xxxvi. 458 (1869–1870) excl. vars.; C. B. Clarke, Journ. Bot. xxv. 269 (1887); Terrac., Malpighia, ii. 311 (1888); Britton, Journ. N. Y. Micr. Soc. v. 101 (1889); C. B. Clarke in Hook. f. Fl. Br. Ind. vi. 627 (1893) and in Durand and Schinz. Consp. Fl. Afr. v. 596 (1895); Husnot, Ill. Cyp. 60, t. 17 (1905–1906); Hegi, Ill. Fl. Mitteleur. ii. 39 (1909 ?); Fiori, Nuov. Fl. Anal. Ital. i. 178 (1923). *Scirpus atropurpureus* Retz. Obs. v. 14 (1789); Reichb. Ic. Fl. Germ. viii. 37, t. 295, fig. 699 (1846). *Isolepis atropurpurea* R. & S. Syst. ii. 106 (1817). *Eleogiton atropurpurea* A. Dietr. Sp. Pl. ii. 97 (1833). *Aplostemon atropurpureum* Raf. ex Steud. Nom. Bot. ed. 2: 113 (1840).[1] *Eleogenus*

[1] The genus *Aplostemon* of Rafinesque, Jour. Phys. lxxxix. 105 (1819), contained the species of *Scirpus* with one stamen. Rafinesque included *Scirpus bracteatus* Bigelow (*Scirpus cespitosus* L. var. *callosus* Bigelow), *S. atropurpureus* Retz., *S. polytrichoides* Retz., and a few others, but did not make any actual combinations. With his characteristic logic he states that species of *Scirpus* with two stamens should form

atropurpureus Nees in Wight, Contr. Bot. Ind. 113 (1834). *Scirpus Lereschii* Thomas, Cat. Pl. Suiss. 44 (1837), *nomen nudum;* Reuter, Suppl. Pl. Vasc. Genève, 40 (1841). *Eleocharis Lereschii* Shuttlew. Flora, xx. 241 (1837); Palla in Koch, Syn. ed. 3. iii. 2545 (1905).[1] *Eleogenus laetivirens* Nees in Mart. Fl. Bras. ii.[1] 103 (1842). *Scirpus erraticus* Rota ex De Notaris, Ann. Sci. Nat. sér. 3. v. 366 (1846) and Linnaea, xix. 398 (1847). *Isolepis setifolia* A. Rich. Tent. Fl. Abyss. ii. 498 (1851). *Eleocharis Zanardinii* Parl. Fl. Ital. ii. 67 (1852). *Eleocharis monandra* Hochst. ex Steudel. Syn. Cyp. 75 (1855). *Isolepis allochroa* and *I. dichroa* Steud. Syn. Cyp. 91 (1855), acc. to C. B. Clarke. *Eleocharis erratica* Steud. Syn. Cyp. 79 (1855). *E. laetevirens* Steud. Syn. Cyp. 79 (1855). *E. multiflora* Chapm. Fl. S. States, 517 (1860). *Elaeocharis atropurpurea* Schur, Enum. Pl. Transsilv. 691 (1885); *Trichophyllum atropurpureum* House, Am. Midl. Nat. vi. 204 (1920). Illustrations: Reichb. Ic. Fl. Germ. viii. t. 295, fig. 699; Fiori, Pl. Ital. Ill. fig. 431; Husnot, Cyp. France, t. 17; Robinson and Fernald in Gray, Man. ed. 7, fig. 243; Britton and Brown, Ill. Fl. ed. 2, i. fig. 763; C. B. Clarke, Ill. Cyp. t. 36, figs. 6–9.—Scattered in distribution in the tropics of both the Old and New World; in the United States from Florida and Georgia to Iowa, Nebraska, Colorado, Washington and Texas; also in Italy and Switzerland. The specimens which I have seen are: Georgia: sandy shore of Four Mile Pond, Decatur Co., *R. M. Harper* 1934. Florida: Jackson Co. *Chapman;* Key West, *Riddell* (N. Y.). Texas: bed of Cibolo River, Selma, *H. A. Groth* 132. Colorado: La Poudre River near Greeley, *E. L. Greene.* Nebraska: Exeter, Fillmore Co. *J. H. Wibbe* (N. Y.). Iowa: Muscatine, *Reppert* in 1895. Mexico: Guadalajara, *Pringle* 4002 (in part), *Pringle* 3857 (N. Y.). Colombia: circa de Piedras, *André* no. 1900. India: Plan. Gang. Sup. *Hooker & Thomson;* Bengal, *Griffith.* Africa: Nubia, *Kotschy* 129 (*E. monandra*). Switzerland: Lac Leman, *Leresche* in 1861, *Muret* 13, *Godet* in 1853, *Lerch* in 1872.

This species can be readily identified by the minute glistening-black achenes with translucent setae.

The type locality is India. In Europe *E. atropurpurea* is isolated in northern Italy and about Lac Leman, Switzerland; and in regard to its presence there Palla (Koch. Syn. ed. 3. iii. 2546) writes "This tropical species has without doubt first (and at a comparatively late

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the genus *Diplarinus*, and those with a bifid style another genus, *Dichismus*. (For a discussion of *S. bracteatus* Bigel. see Fernald, Rhodora, xxiii. 24 (1921)). The genus *Megadenus* of Rafinesque, Neogenyton, 4 (1825) differs from *Scirpus* in having two stamens and the achene crowned by a gland. "*Sc. palustris, capitatus, tuberculatus,* etc." No new combinations were actually made.

[1] Palla takes up the name *E. Lereschii*, since, in his estimation *E. atropurpurea* (Retz.) Kunth is a collective species. There is, however, no mistaking *Scirpus atropurpureus* Retz. It is impossible to follow accurately the synonymy of this species as regards the South American material.

time, perhaps by transportation agencies) arrived in Italy and from there made its way into Lake Leman." Merrill has not seen it from the Philippines. Bentham & Mueller cite *E. atropurpurea* from Australia and describe var. *setiformis* which has filiform culms less than 2 inches high; bristles very short or none. Fiori (Nuova Fl. Anal. Ital. l. c.) makes the following division:

A. Persistent base of the style orbicular-depressed. α. TYPICA.
B. Persistent base of the style acute-elongated: spikelet and achene larger than the type. (Endemic in Italy). β. ZANARDINII.

Regarding the number of stamens in this species, Kunth (l. c.) says that the Wallich specimens have three stamens, but *Wallich* 3489[a] has all the flowers with one stamen. Both the African material (*Kotschy* 129) and Texas material have one stamen; occasionally two. The Switzerland material has two stamens, rarely one.

44. E. PRATICOLA Britton. FIG. 46. Culms slender, 4–12 cm. long, tufted, often spreading or recumbent: upper sheaths oblique and firm at the apex: spikelets 5–15-flowered, broadly ovoid, 2–3 mm. long: scales brown, ovate to lanceolate, obtuse, becoming lax in age: achene lenticular, obovoid, about 0.5 mm. long, black, shining; the style-base whitish, apiculate, less than ⅓ as wide as the achene: bristles coarse, white or light-brown, obscurely toothed, shorter than the achene, or often rudimentary.—Britton in Small. Fl. Se. U. S. 182 and 1327 (1903). *Scirpus ocreatus* Griseb. Pl. Cub. 239 (1866). *E. atropurpurea* C. B. Clarke in Urban, Symb. Ant. ii. 65 (1901), in part.—Florida, Cuba, and the Bahama Islands. FLORIDA: low places on prairies, Osceola Co., *A. Fredholm* 5820 (TYPE in herb. New York Bot. Gard.); low pinelands, Fort Meyers, *Jeanette Standley* 29; Dade Co., *A. A. Eaton* 837, in part. CUBA: *C. Wright* 3371 (in part). BAHAMA ISLANDS: Andros, *Small & Carter* 8684.

Since this species has black achenes about 0.5 mm. long it has passed as *E. atropurpurea*, from which it differs markedly in thicker, more spreading culms, few-flowered spikelets, coarse bristles and somewhat larger, slightly roughened achenes. It is more closely related to *E. caribaea* than to *E. atropurpurea*. According to the original description the achenes are dark-brown, but material from the type-collection in the Gray Herbarium has achenes which are black when mature, the immature achenes being dark-brown. The type-collection is evidently rather small material; and the species may be more wide-spread.

45. E. BAHAMENSIS Boeckl. Dwarf and sprawling, matted: culms of unequal length, 2–5 cm. long, capillary-setaceous, erect or recurved, obscurely quadrangular and lightly sulcate: apex of upper

sheath firm, oblique, elongated: spikelet minute, 1–2 mm. long, in fruit broadly ovate, 3–9-flowered: scales membranous, acutish, purplish-brown, with a green midrib: achene minute, about 0.5 mm. long, black and shining, the surface slightly roughened: style-base pallid, disciform, apiculate in the center, about ⅔ the width of the achene: bristles 6, slender, of unequal length, a little shorter than the achene, white, retrorsely toothed, united to form a prominent base.—Cyp. Nov. ii. 11 (1890). *E. atropurpurea* C. B. Clarke in Urban, Symb. Ant. ii. 66 (1900) in part (as to Bahama plant); Britton & Millspaugh, Bahama Fl. 49 (1920); not Kunth. *E. camptotricha* var. *Schweinitzii* C. B. Clarke in Urban, Symb. Ant. ii. 69 (1900).—Endemic in the BAHAMAS: Andros; Northeastern section, *Small & Carter* 8807; Conch Sound, *J. I. & A. R. Northrop* 745 (distributed as *E. camptotricha* var. *Schweinitzii*),[1] Fresh Creek settlement, *A. E. Wight*, 257 (distributed as *E. camptotricha* var. *Schweinitzii*).

46. E. MICROFORMIS Buckley. FIG. 45. Culms light-green, cespitose, setaceous, 4–10 cm. long, lightly sulcate, erect or arching: spikelets ovoid, obtuse or acute, 10–20-flowered; scales acute or obtuse, with a green or yellow midrib and light brown hyaline sides, sometimes rufescent: style bifid: stamens 2: achene 0.7 mm. long, broadly obovoid-pyriform, black, shining, the surface minutely pitted: style-base half as broad as the achene, pallid, flattened, apiculate in the middle: bristles 6, light-brown or whitish, coarse, of unequal length, retrorsely scabrous, shorter than the achene.—Proc. Acad. Sci. Phila. (1862) 10 (1863). *E. atropurpurea* Britton, Jour. N. Y. Micr. Soc. v. 101 (1889), in part.—TEXAS: northern Texas, *Buckley* (TYPE in herb. Philadelphia Acad.); *Reverchon* 14 in 1885; Blanco Co., *Reverchon* 3594; Howard's Creek,)[2] Crockett Co., *C. Wright* 1930; *C. Wright* 1932, 1961; vic. Kerrville, Kerr Co., *A. A. Heller* 1851.

SPECIES DOUBTFUL OR NOT SEEN

E. EKMANII Kükenthal in Fedde, Rep. Spec. Nov. xxiii. 192 (1926). FIG. 44. —Cuba.

The achene of this species (as represented by *Ekman* 19005 in the

[1] Britton and Millspaugh (l.c.) discuss the incongruity of this name as applied to the Northrop specimens. Clarke's description reads: "stylobasi bulbiformi; spiculis basi interdum proliferis; nuce proventu luteo-brunnea. *Eleocharis prolifera Torrey! in Ann. Lyceum New York III (1836) p. 316, nec p. 442.* . . . . Hab in ins B a h a m a : Northrop n. 524[b]; G u a d e l o u p e : Bertero."

E. camptotricha is a member of an entirely different section with triangular achenes. Since *Northrop* 524b is the only tangible reference (and the description of the variety does not seem adequate), the only disposition of the name is as a questionable synonym of *E. bahamensis*.

[2] Although the label reads "C. Wright, Coll. N. Mex. 1851–1852," some of the collection was made in Texas by Wright in 1852, enroute from El Paso to San Antonio, in returning from the expedition,—see Gray, Plantae Wrightianae ii. 6 (1853). "Howards Creek" is written on the label by A. Gray and it is probable that no. 1932 and 1961 were collected in the same general region.

Stockholm Museum) is identical in size, coloration, and bristles with the achene of *E. caribaea*. The style-base is thickened, as is often the case in *E. caribaea*, by white pustule-like enlargements of the exterior cells. The plant, however, is very dwarf, 3–5 cm. high, and with inrolled lanceolate scales. It differs from *E. praticola* in the broad tubercle, and larger achene. Dwarf plants of *E. caribaea* with capillary culms occur, as in the collection by *W. E. Broadway* (Nov. 24, 1898) from Grenada, and *Maxon & Killip* 266 from Jamaica, and there is a tendency in some of these to have soft scales, which tend to become inrolled. Further study of them is needed.

E. SHAFERI Britton, Mem. Torr. Bot. Club, xvi. 59 (1920). Perennial; culms capillary, weak, densely tufted, about 2 dm. long: upper sheath apparently not scarious: spikelet oblong, 4–5 mm. long, 1–1.5 mm. thick, acute, few-flowered: scales pale, appressed, obtuse or obtusish, oblong or oblong-lanceolate; the lower one 2–2.5 mm. long, shorter than the upper ones: bristles 4–6, brownish, about as long as the achene and tubercle: style-branches 2: achene black, lenticular, oblong, 1 mm. long: tubercle sharply conic, ¼ as long as the achene.—Bog-holes in wet thicket, Sierra Nipe near Woodford, Oriente, Cuba (*Shafer* 3414).

E. MADAGASCARIENSIS Chermezon, Bull. Soc. Bot. France, lxxv. 284 (1928).—Madagascar.—It differs from *E. caribaea* in its perennial character, lanceolate spikelet and less densely imbricated scales, larger achene (1 mm. long) and conical style-base.

Sub-series OCREATAE

47. E. OLIVACEA Torr. FIG. 43. Culms light-green, often decumbent, 2–15 cm. long (–3 dm. in elongate plants from the Southern States), flattened and grooved, diffusely tufted from slender rootstocks: apex of upper sheath membranaceous but not conspicuously dilated: spikelets oblong-ovoid, acute, 20–30-flowered, 3–7 mm. long: scales ovate, rather membranous and loosely imbricated, with green keel and brown sides, sometimes green throughout: style bifid: stamens 2 or 3: achene obovoid, narrowed at the base, 1 mm. long, olive to dark-brown; the surface punctulate and often marcescent: the conical style-base light-green, annular-thickened at the base, one-fourth as wide as the achene, sometimes prolonged into a subulate beak: bristles 6–8 (usually 7), green or whitish, opaque or semi-translucent, exceeding the achene, retrorsely toothed.—Ann. Lyc. N. Y. iii. 300 (1836) and Fl. N. Y. ii. 347 (1843); Boeckl., Linnaea, xxxvi. 461 (1869–1870); Britton & Brown, Ill. Fl. i. 250, fig. 581 (1896); Robinson & Fernald in Gray, Man. ed. 7: 182, fig. 242 (1908). *Scirpus olivaceus* Kuntze, Rev. Gen. i. 758 (1891). *Trichophyllum*

olivaceum House, Am. Midl. Nat. vi. 205 (1920).—Quagmires and wet sandy shores; Nova Scotia to Ontario, and southward to Florida, western Pennsylvania, Ohio, and Michigan, chiefly on the coastal plain. The following, selected from a large representation, are characteristic. NOVA SCOTIA: Argyle Head, Yarmouth County, *Fernald & Long* 23368; Wallace Lake, Italy Cross, Lunenberg County, *Fernald & Long* 23367; Tiddville, Digby County, *Fernald & Long* 20128. MAINE: tidal mud flats, Bowdoinham, *Fernald & Long* 12783; Somesville, *Fernald* in 1892; Brunswick, *C. A. Davis* in 1894. NEW HAMPSHIRE: Lower Baker Pond, Wentworth, *E. F. Williams* in 1908; Nottingham, *A. A. Eaton.* VERMONT: Lake Dunmore, *Brainerd* in 1899; Bristol Pond, *Pringle* in 1879; in mucky border of a pond, alt. 1500 ft., Ripton, *Brainerd* in 1899; Newfane, *A. J. Grout* in 1892. MASSACHUSETTS: Long Pond, Saugus, *C. E. Faxon* in 1879; Norwood, *Robinson & Fernald* in Pl. Exsicc. Gray. 134; Plymouth, *E. Tuckerman;* West Tisbury, *F. C. Seymour* 1096, 1601, 1864; Springfield, *C. H. Bissell* 901. RHODE ISLAND: Providence, *S. T. Olney.* CONNECTICUT: Pachaug Pond, Griswold, *C. B. Graves* 278; Lyme, *C. B. Graves* 279, 280; New Haven, *J. A. Allen* in 1878; North Guilford, *G. H. Bartlett* in 1906; Stratford, *E. H. Eames* in 1897. NEW YORK: Chase's Pond, Newcomb, *H. D. House* 11386; Slayton Pond, Conquest, *Eames, Randolph & Wiegand* 11411; Mud Pond, Oswego, *Fernald, Wiegand & Eames* 14182; Waterloo, *Metcalf & Wiegand* 5904; Summit Marsh, Spencer, *C. C. Thomas* 1759. NEW JERSEY: Tom's River, *C. F. Parker* in 1867; Winslow Junction, *Gershoy* 140; Point Pleasant, *Gershoy* 145; Manahawkin, *Long* in 1909; Wading River, Catsworth, *Van Pelt* in 1907. PENNSYLVANIA: Presque Isle, *Garber* in 1868; Long Pond, Luzerne County, *A. A. Heller* 698. MARYLAND: Clinton, *Holm* in 1922. DELAWARE: St. George, *A. Commons* in 1865. VIRGINIA: Fresh Pond, Princess Anne County, *L. F. & F. R. Randolph* 486. GEORGIA: *Baldwin* (Ph.). FLORIDA: sandy bed of a shallow stream, Milligan, *A. H. Curtiss* 6914. ONTARIO: Galt, *Macoun* in 1902; Bay of Quinte, *Macoun* 297. MICHIGAN: Park Lake, near Lansing, *C. F. Wheeler* in 1890. OHIO: Cleveland, *E. Claassen.*

Torrey (l. c. 1836) cites *E. olivacea* from "Pine barrens of New Jersey!; on Long Island near Babylon!; Tewksbury pond, Massachusetts." This member of a partly tropical group makes its way up the Atlantic Coastal Plain, spreading out into muddy shores of ponds in the glaciated area of the northeastern United States and southern Canada. Its occurrence inland is, however, localized. In quagmires bordering the sandy ponds of southeastern Massachusetts it is ubiquitous, and in the same region it reaches a phenomenal development in mud at the upper borders of salt marshes. In specimens from the New Jersey pine barrens and from Delaware, the

scales sometimes take on a coriaceous aspect, as in specimens collected by *Commons* at St. George, Delaware. Some of the southern material has the culms greatly elongated, notably *Gershoy* 145, *Randolph* 486 and *Curtiss* 6914. Clarke, Contr. U. S. Nat. Herb. x. 455 (1908) cites this species from Costa Rica (*Tonduz* 9697), but its presence there seems improbable.

48. E. **galapagensis**, n. sp., rigidula; culmis 12–26 cm. longis, erectis, viridibus, striatis; vaginis 3–5 cm. longis, membranaceis, obscuris, ad apicem marcescentibus, haud inflatis; spiculis 4–6 mm. longis, lanceolatis vel ovatis, ca. 15-floris; squamis linearibus, obtusis, 3 mm. longis, castaneis, dorso viridibus, erosis, ima majore viridi; achaenio obovato, nitente olivaceo, levi obscure striatulo; stylobasi parva, conica, viridi vel brunnea; setis cum achaenio aequilongis, albis.—GALAPAGOS ISLANDS: abundant in marshy ground, 1700 ft. altitude, Wreck Bay, Chatham Island, *A. Stewart* 1079 (TYPE in Gray Herb.).

This species differs from *E. flaccida* (which it resembles in its elongated aspect) in the castaneous spikelets and olivaceous achenes. The achenes resemble those of *E. Sellowiana* in color and striation, but the culms are not inflated.

49. E. SCHAFFNERI Boeckl. FIG. 39. Caespitose; culms light-green, capillary, setaceous, spreading, sulcate, 3–5 cm. high: apex of upper sheath membranous, scarcely inflated, obtuse: spikelet ovate, somewhat acute, 2–3 mm. long, 7–15-flowered: scales membranous, green, sometimes with light-reddish or bronze sides, broadly ovate, obtuse or acute: style bifid: stamens 2 or 3: achene 0.7 mm. long, olive-green; the surface with elongate black striations: style-base very small, flattened, gray, slightly apiculate, one-fourth as wide as the achene: bristles 6 or 7, white, somewhat shorter than the achene.—Boeckl. in Engler, Bot. Jahrb. vii. 274 (1886). *E. exilis* Boeckl. Cyp. Nov. i. 16 (1888).—MEXICO.

The type-collection is *Schaffner* 204 from San Luis Potosi. I have not seen this number, but *Schaffner* 575 (in part) from Morales, San Luis Potosi, in the Gray Herbarium, is unquestionably *E. Schaffneri*. On this sheet are three plants, the two smaller conforming exactly to the description. The larger specimen has identical achenes, but is a coarser plant, 12 cm. tall. However, I believe that it is the same, and that subsequent collections may furnish us with intermediate plants. This species is easily recognized by the very small olive-green achenes with depressed tubercles, and by the cespitose habit. *E. exilis* is likewise based on *Schaffner* 204, and the achene is described as light-green and longitudinally striolate.

50. E. Sellowiana Kunth. Fig. 42. Culms numerous, erect, somewhat spongy and thickened, 8–15 cm. long, 1.5–2 mm. wide when dry, striate, constricted below the spikelet: upper sheath with a divided hyaline fugacious apex: spikelet 5–10 mm. long, ellipsoid, acute, many-flowered: scales appressed, oblong, obtuse, scarcely keeled, stramineous, with a narrow brown stripe on each side of the midrib: style 2-fid: stamens 3: achene 0.8–1 mm. long, broadly obovate, turgid-lenticular, somewhat flattened at the margin, olivaceous, shining, minutely black-striate: style-base yellowish-green, short-conic, acute, marginulate below, about one-fourth as wide as the achene: bristles 7 or 8, glistening-white, shorter than the achene.—Enum. ii. 149 (1837); Boeckl. Linnaea, xxxvi. 465 (1869–1870); C. B. Clarke, Pl. Hassler, ii. 238 (1903); Hauman & Vanderveken, Phan. Argent. i. 210 (1917). *Eleogenus Sellovianus* Nees in Mart. Fl. Bras. ii.[1] 103 (1842). *Scirpus Sellowianus* Griseb. Symb. Fl. Argent. 312 (1879).—Brazil and Paraguay.

I have seen no authentic specimen, but *Ostén* 7882 (S) from Villa Eucaruaciou, Paraguay, from which the above description has been drawn, agrees very well with the description by Nees.[1] (Fl. Bras. l. c.; and specimens with more slender culms but identical achenes have been identified as *E. Sellowiana* by C. B. Clarke (S). According to Nees, *Eleogenus Sellovianus* differs from *E. orcreatus* in the thicker culms, somewhat constricted below the spikelet, and in the less plicated character of the sheath-apex. In the Ostén specimen the achenes are finely marked with short black striations.

Var. homonyma (Steud.) Pfeiffer. Spikelets oblong-ovate: scales broadly hyaline at the margin: bristles 3.—Pfeiffer, Herbarium, no. 56: 54 (1921). *Eleocharis homonyma* Steud. Syn. Cyp. 79 (1855), which is based on *Lenormand* 36, Herb. Paris, from Guiana.

I have seen no material.

51. E. capillacea Kunth. Fig. 50. Rootstocks extensively creeping, forming dense mats: culms numerous, capillary, from thickened nodes of the rhizome, 1–4 cm. high, often arched or recurved: upper sheaths reddish-brown or greenish, membranous, slightly inflated at the apex: spikelets 2 mm. long, brown, linear to lanceolate, 1–3-flowered; usually only one achene ripening: scales 2–3, ovate-oblong, acute, reddish-brown, with a hyaline margin: style bifid: stamens 1 or 2: achene obovate, deep purplish-brown to shining-black when mature, 1 mm. long, narrowed at the base: style-base

[1] Some of the descriptions by Kunth, l. c. (1837) were apparently drawn from Nees' material or manuscript (cf. *E. albibracteata*).

depressed, greenish, one-half as wide as the achene, with a free thin margin below, extended upward into a narrow acute beak: bristles usually 7, brown, conspicuously toothed, somewhat exceeding the achene.—Enum. ii. 139 (1837); Boeckl. Linnaea, xxxvi. 434 (1869–1870); C. B. Clarke in Pl. Hassler. ii. 235 (1903); Palla in Wettstein, Bot. Exped. Südbras. i. 172 (1908); not *Scirpus capillaceus* Griseb. Cat. Fl. Cubens. 239 (1866) nor *Eleocharis capillacea* (as to West Indian plants) of C. B. Clarke in Urb. Symb. Ant. ii. 65 (1900), nor Kukenthal in Fedde, Rep. Spec. Nov. xxiii. 191 (1926). *Chaetocyperus capillaceus* Nees in Mart., Fl. Bras. ii.[1] 93 (1842).—Widely distributed in tropical South America. I have seen the following specimens. BRAZIL: *Sellow;* Agoa Clara, *Glaziou* 22328; opp. Curityba in campo humido, Parana, *Dusén* 117a (G, S); Ponta Grossa, Santa Cruz, *Dusén* 2707 (S); Santa Rita do Passo Quetro, S. Paulo, *Hemmendorf* 61 (S); in ripa arenosa rivi Cuyaba Mirim, Sao José, Matto Grosso, *Lindman* A2665 (S); Diamantino, Matto Grosso, *Lindman* A3515 (S); Prov. Magy-mirim, S. Paulo, *Mosén* 1751 (S); in ripa rivuli argillosa reptans, Sao Joao d'el Rei, Minas Geraes, *Lindman* A179 (S); Caldas, Minas Geraes, *Lindberg* 587 (S), 583 (S); Goyas, *Glaziou* 22328 (S). PARAGUAY: in viciniis Caaguazú, *Hassler* 9431.

The West Indian material is referred to *E. alveolata*, described on p. 241.

52. E. FLACCIDA (Reichb.) Urban. FIG. 47. Culms slender, light-green 0.5–4 dm. long, usually soft and lax, striate, in small specimens sometimes becoming somewhat rigid: apex of sheath membranous, white, inflated: spikelets 2–6 mm. long, ovate, acute or blunt: scales elliptic to oblong-lanceolate, membranous, pale-green or nearly white: style bifid: stamens 3: mature achene lustrous, purplish-brown, 0.8 mm. long, obovate, the surface minutely punctulate: style-base green, conic, acute; bristles 6 or 7 (rarely none), shining-white, shorter than the achene, retrorsely toothed.—Symb. Ant. ii. 165 (1900); Britton & Millspaugh, Bahama Fl. 48 (1920); Britton & Wilson, Bot. Porto Rico & Virgin Isl. 90 (1923). *Scirpus flaccidus* Reichb. ex Spreng. f. Tent. Suppl. Syst. 3 (1828). ? *S. flavescens* Poir. in Lam. Encyc. vi. 756 (1804). *E. capitata* Kunth, Enum. ii. 150 (1837), in part. *Eleogenus ocreatus* Nees in Mart. Fl. Bras. ii.[1] 102 (1842) in part, especially var. *flaccidus*. *Eleoch. ochreata* (Nees) Steud. Syn. Cyp. 79 (1855); Britton & Brown, Ill. Fl. i. 249, fig. 580 (1896); C. B. Clarke in Urb. Symb. Ant. ii. 63 (1900); Lindman, Regn. Cyp. 14, t. 2, fig. 1 (1900); Robinson & Fernald in Gray, Man. ed. 7: 181, fig. 241 (1908). *E. binocrenata* Nees ex Steud., Syn. Cyp. 79 (1855). *S. ocreatus* Griseb., Fl. Br. W. Ind. 570 (1864). *E. albivaginata* Boeckl. Vidensk. Med. Kjob. 1869: 133 (1870) and Linnaea, xxxvi. 436 (1869–1870) in part, especially var. *flaccida; S. anisochaetus* C. Wright in Sauv. Fl. Cub. 174 (1871). *E. thermalis*

Rydb. Mem. N. Y. Bot. Gard. i. 69 (1900). *E. flavescens* (Poir.) Urban, Symb. Ant. iv. 116 (1903). *Trichophyllum ochreatum* and *T. thermale* House, Am. Midl. Nat. vi. 205 (1920).—Southern New Jersey (acc. to W. Stone, Pl. So. N. J. 259 (1910)), ? South Carolina and Georgia to Mississippi, and in hot springs at Yellowstone Park; southward into tropical America. I have seen the following specimens: South Carolina: *Ravenel* (perhaps not from South Carolina). Georgia: Alexander, Burke County, *J. B. Ellis* in 1860; Bulloch County, *R. M. Harper* 952. Florida: shore of St. John River, Jacksonville, *Curtiss* 3076; miry places near Jacksonville, *Curtiss* 5065; moist sandy ground near Jacksonville, *Curtiss* 5694; Indian River, *Curtiss* 5806; Eustis, Lake County, *Nash* 2077; Apalachicola, *Chapman* 3880. Mississippi: Biloxi, *Ball & Tracy* in 1903. Wyoming: Sylvan Geysers, Yellowstone Park, *A. Nelson* 6157 (P, G); Lower Geyser Basin, Yellowstone Park, *Rydberg & Bessey* 3812. A specimen in the Pomona College herbarium collected by *Burton*, at St. Thomas, California in 1882 may belong to this species. Cuba: *C. Wright* 711 (in part, mixed with *E. praticola*); *C. Wright* 3761 (*S. anisochaetus*); La Perla, Oriente, *J. A. Shafer* 8570. Porto Rico: near Anasco, *A. A. Heller* 4532; *Sintenis* 176, 4180, *Eggers* 1330 (U. S.) Jamaica: Peckham, Upper Clarendon, *Harris* 12809; near Albion, St. Thomas, *Harris* 12169. Martinique: *Hahn* 703. Costa Rica: San Ramon, *Brenes* 14439. British Guiana: *Jenman* 6117 (U. S.); *Hitchcock* 17026. French Guiana: vic. Cayenne, *Broadway* 940 (U. S.). Venezuela: near Caracas, *Pittier* 9638, 9636; Colonia Tovar, Aragua, *Pittier* 9959. Brazil: Rio de Janeiro, *Wilkes Exped.*, 1838–1842. Paraguay: *Hassler* 5563 (very young). Reported by C. B. Clarke from many localities in the Old World. *Burchell* 1171 and 1600 from Brazil with very turgid achenes are perhaps to be included in this species.

In the southern United States, specimens of *E. flaccida* have often been confused with *E. olivacea*. Although several reports exist of its occurrence in Delaware, Virginia, and New Jersey, I have seen no undoubted specimens from north of Georgia.

The name *E. flaccida* seems to be strictly applicable only to the tall lax plant described by Sprengel as similar in appearance to *Scirpus simplex* Elliott, and coming from Dutch Guiana. This tall, lax plant I have seen from southern United States only in two collections, *Chapman* 3880 and *Harper* 952, but it apparently descends gradually into the dwarf, sometimes even rigid plant which has been included in *E. flaccida* by both Urban and Britton and which is treated by C. B. Clarke under typical *E. ochreata* Nees. *E. flavescens* seems to be involved, but I do not think its status can be determined until the actual Poiret specimens are examined. *Scirpus flavescens*

Poiret was described from a collection by *Ledru*, and characterized by greenish-yellow culms, "3 poll." [app. 7 cm.] high, enveloped at the base by a membranous sheath prolonged to an almost subulate point. The green spikelet, 1–3-flowered, was furnished at the base with two opposite, obtuse, concave scales a little shorter than the flowers. The achene is not described.

The name *Eleocharis ocreatus* has a peculiar status. The first adequate publication of the specific name is by Neeis n Martius, Fl. Bras. (l. c.) as *Eleogenus ocreatus*, referring to *Eleocharis ochreata*, Linnaea, ix. 294 (1834) (a *nomen nudum*) as a "lapsu calami." The specific name refers to the peculiar character of the sheath-apices, comparable to the *ocreae* in the *Polygonaceae*. So complicated is the synonymy that it seems best to include here a brief tabular resumé (in English) of Nees' polymorphic *Eleogenus ocreatus* (l. c.) in order to obtain a clear interpretation of species which may be involved:

α. Spikelets obtuse at both ends.
  a. 1 *minor*. Membranaceous sheaths conspicuous, often duplicate. *Gardner* 150.
  a. 2 *flaccidus*. Membranous sheaths not distinct; culms taller ("pedalibus"). *E. sulciculmis* Reichb. in Sieb. herb Trinit. n. 4. *Scirpus flaccidus* Reichb. in Weigelt herb. Surinam.
β. Spikelets acute at apex and base ("acutiuscula").
  b. 1 *pallida*. Spikelet pale green. Brasil. orient. *Chamisso & Sello.*
  b. 2 *albo-ater*. Scales fuscous, margins white. *S. albo-ater* Schrader in Sched. Sao Paulo.
  b. 3 *binocreatus*. Scales as in preceding; sheath-apex inflated, rugose. *Macrae:* Ins. St. Catharine. *E. maculosa* forma *humilis* Kunth, En. ii. 147. [No definite publication by Kunth and no citation of specimen]. *E. arcuata* Kunze in Poepp. Coll. Chil. n. 11.

For apparently no good reason, Boeckeler replaced *Eleogenus ocreatus* by the equally polymorphic *Eleocharis albivaginata* and under the latter treated five varieties: α. *tenuis* (Brazil, *Sello*); β. *flaccida* (*S. flaccidus* Reichb.); γ. *stricta* (*E. sulciculmis* Reichb. and *S. Gaudichaudianus* Kunth); δ. *macrostachya* (Brazil, Montevideo (*Sello*), Porto Rico); and ε. *humilis* (*S. flavescens* Poir. in hb. Willd. no. 1162, and *S. repens* Willd. no. 1175). Var. *humilis* was cited by Boeckeler from Carolina (*Beyrich*), Brazil (*Chamisso, Sello*) and Mauritius (*Du Petit-Thours*). *Scirpus flavescens* of the Willdenow herbarium is not necessarily identical with the Poiret specimen, but according to Urban, Symb. Ant. iv. 116 (1903) "ex hb. Desfont., verisimiliter a Ledru lect." *S. flavescens* was collected by Ledru in Porto Rico. C. B. Clarke in Durand & Schinz, Consp. Fl. Afr. v. 599 (1895) and in Urban, Symb. Ant. ii. 63 (1900) revived the name *Eleocharis ochreata*, still treating

it as covering a polymorphic species, but recognizing only two varieties besides the typical plant: β. *flaccida*, the elongated plant (3–5 dm. long) and γ. *humilis* (Boeckl.), the latter being the dwarf rigid plant, its range extended by Clarke to tropical Africa, Socotra, Madagascar, the Mascarenes and Australia. Finally Urban, Symb. Ant. ii. 165 (1900), made the combination *Eleocharis flaccida*, thus retaining the earliest specific name, but still equivalent, according to Urban, to "*Eleocharis ochreata Nees (1834) cum var. flaccida et humilis.*" It is to be hoped that an examination of the plants representing the synonyms included by Nees under *Eleogenus ocreata*, in correlation with the more recent collections from South America, will clear up the difficulties of nomenclature of the American plants.

I have seen no material from the Old World, included under *E. ochreata* var. *humilis* by C. B. Clarke. Chermezon, Bull. Soc. Bot. France, lxxv. 285 (1928) considers the Madagascar plant as *E. minuta* Boeckl. in Engler, Bot. Jahrb. v. 503 (1884). The type, *Hildebrandt* 3527, is a dwarf plant 1–2 cm. high, with sulcate quadrangular culms. Merrill, Enum. Phil. Plants, i. 120 (1922) states that he has seen no specimens of *E. ochreata* from the Philippines, although C. B. Clarke, Phil. Journ. Sci. Bot. ii. 90 (1907) assigns *Loher* 742 to that species.

Var. FUSCESCENS Kükenthal in Fedde, Rep. Spec. Nov. xxiii. 191 (1926).—Culms strict, 5–10 cm. high: scales fuscescent on the sides, the margins broadly whitish-hyaline.—Kükenthal cites two specimens from CUBA: *Ekman* 18763 from Pinar del Rio and *Ekman* 18369b from Prov. Santa Clara. I have not seen these specimens but *A. A. Eaton* 837 (in part) from Dade County, FLORIDA, in the Gray Herbarium, probably belongs to this variety, although the culms are only 3–5 cm. high.

53. E. MACULOSA (Vahl) R. & S. FIG. 40. Stolons elongate, castaneous: culms 7–35 cm. long, erect, striate, rigid: apex of upper sheath conspicuously enlarged, scarious, and rugose: spikelet 5–12 mm. long, ovoid to lanceolate, many-flowered, the scales densely imbricated: scales ovate, rather blunt, firm, shining, purplish-brown, with scarious margins; the lowest orbicular, with a prominent green midrib: style bifid: stamens 3: achene obovoid, narrowed at the base, 1 mm. long (not including the style-base), shining-black; the surface minutely roughened: style-base half as wide as the achene, light-brown, with a dilated base and a narrow subulate beak: bristles 7–8, reddish-brown, of unequal length, some usually equalling the achene; the retrorse teeth small but very numerous.—Syst. ii. 154 (1817); Kunth, Enum. ii. 146 (1837); Boeckl., Linnaea, xxxvi. 460 (1869–1870); C. B. Clarke in Urban, Symb. Ant. ii. 64 (1900) and in Engler,

Bot. Jahrb. xxx. Beibl. 68: 18 (1901). *Scirpus maculosus* Vahl. Enum. ii. 247 (1805). *Eleogenus ocreatus* vars. β2. *albo-ater* and β3. *binocreatus* Nees in Mart. Fl. Bras. ii.[1] 102 and 103 (1842) acc. to Boeckl. (l. c.). *Eleogenus Schottianus* Nees in Mart. l. c. 102 (1842). *Eleocharis Schottiana* Steud. Syn. Cyp. 79 (1855). *Trichophyllum maculosum* House, Am. Midl. Nat. vi. 205 (1920).—I have seen no specimens from the United States or Mexico that can be identified with this species, although C. B. Clarke has referred *Berlandier* 2090 from Texas to *E. maculosa*.[1] The type collection (*Richard*) is from Guadaloupe, and the species is apparently of frequent occurrence in tropical South America. Specimens examined. GUADALOUPE: *Duss* 3911. COLOMBIA: Agua Sucia, alt. 1800 m., *Langlassé* 88; Dept. Santander, *Killip & Smith* 21134, 19549 (very young); west of Popoyan, alt. 1500–1700 m., Dept. El Cauca, *Pennell & Killip* 7196, 8166, 8237 (in small part). VENEZUELA: near Merida, 1700 m. alt., *Pittier* 12860 (U. S.). BRAZIL: Sao Paulo, Kneucker Exsic. Cyp. 193; Rio de Janeiro, *Wilkes Exped.* 1838–1842; Organ Mts., *Gardner* 720 (G, U. S.); Parana, *Dusén* 3751 (U. S.), *Glaziou* 16526 (U. S.); Bahia, *Salzmann* (U. S.).[2]

According to C. B. Clarke in Engler, Bot. Jahrb. (l. c.), E. VINCENTINA Philippi, Anal. Univ. Chil. xciii. 349 (1896), a Chilean species, differs from *E. maculosa* in shorter culms, pallid bristles (not rufescent), and in smaller spikelets (4–5 mm. long). It is said to differ from *E. ochreata* Nees (see *E. flaccida*) in castaneous spikelets and more rigid habit. *Philippi* 45 and 130 are cited by Clarke, and as synonyms *E. melanocarpa* Philippi, Linnaea, xxix. 85 (1857–1858); *E. hyalovaginata* Philippi, Anal. Univ. Chil. xciii. 352 (1896) and *Isolepis fuscopurpurea* Steud. Syn. Cyp. 99 (1855). *I. fuscopurpurea* is based on *Philippi* 265 from Valdivia, which is, however, described with a trifid style and without achenes. E. VINCENTINA var. ARCUATA C. B. Clarke (l. c.) has culms 5–14 cm. long, less rigid and often recurved. *Philippi* 46, 117 and 32 are cited, and in synonymy *E. arcuata* Kunze mss. ex Johow. from Juan Fernandez, *E. maculosa* Desv. in C. Gay, Fl. Chil. vi. 172 and *Scirpus Desvauxi* Philippi, Anal. Univ. Chil. xciii. 482 (1896).

54. E. INTRICATA Kükenthal. Rhizomes very slender, interwoven, and forming dense mats: culms 3–9 cm. high, compressed-quadrangular, striate, slender but firm, often recurved: sheath-apex hyaline, lax, attenuate: spikelet ovate to lance-ovate, 3–4 mm. long, about 5-flowered: scales not closely imbricated, rather acute, strongly keeled, with greenish-yellow midrib and brown sides;

[1] Britton, Journ. N. Y. Micr. Soc. v. 101 (1889).

[2] The Brazilian specimens differ consistently in having slender elongated culms and larger, thicker spikelets, with closely appressed scales.

the margins scarcely hyaline: achene obovate, 1 mm. long, shining-black, minutely punctulate, contracted at the base: style-base conic, acute, somewhat compressed, half as broad as the achene, of the same color as the bristles: bristles 6 or 7, exceeding the achene, white or light-brown, retrorsely scabrous; the bases united to form a prominent ring.—Kükenthal in Fedde, Rep. Spec. Nov. xiii. 135 (1914).—AFRICA: Nyassa-Highlands, Station Kyimbela, Rungwe, alt. 1600 m., *A. Stolz* 1132 (TYPE-COLLECTION, Ph.).

According to Kükenthal (l. c.) *E. intricata* is close to *E. olivacea* Torr. and *E. Sellowiana* Kunth, differing from the first in the shiny black achenes and from the latter in the smaller spikelets, color of the achenes, and the broader style-base.

Kükenthal (l. c.) also describes E. MAIDENII, a new species from New South Wales: Byron Bay (*W. Forsyth*); Centennial Park, Port Hacking (*A. Hamilton*). The achene is olive-green when mature, but is smaller than that of *E. olivacea*. The bristles are scarcely longer than the achene. The sharply-keeled scales clearly separate it from *E. olivacea* and *E. Sellowiana*. *E. intricata* is separated from *E. Maidenii* by the less membranous sheaths and the black achenes. From the same region E. MAIDENII var. SUBAQUATICA Kükenthal is described. This has flaccid culms up to 30 cm. in height and the spikelet is at times proliferous. I have seen no specimens.

55. E. DEBILIS Kunth. FIG. 41. Culms numerous, 15–20 cm. long, sub-capillary, lax: upper sheath membranous, truncate: spikelet ovate, 3–4 mm. long, 10–15-flowered, acute: scales ovate-elliptic, narrowed toward the apex, rather blunt, pale-brown, with a prominent green keel: style 2-fid: stamens 3: achene obovate, 1–1.3 mm. long, smooth, black (yellow when immature), with a short conical tubercle dilated at the base: bristles 6 or 7, brown, slender, retrorsely toothed, somewhat exceeding the achene.—Enum. ii. 143 (1837); Nees in Mart. Fl. Bras. ii.[1] 104 (1842); Boeckl. Linnaea, xxxvi. 434 (1869–1870); Lindman, Regnell. Cyp. 15, t. 2, fig. 4 (1900); Palla in Wettstein, Exped. Kaiserl. Akad. Südbrasil. i. 172 (1908).

The original collection was by *Sello* in Rio de Janeiro. The only specimen which I have examined is *Mosén* 3510 (S), collected at Santos, Sao Paulo (det. by C. B. Clarke and figured in Lindman, Regnell. Cyp. l. c.). This plant is readily distinguished from other members of the section by the capillary culms and broad greenish spikelets.

Forma MACRA (Kunth) Boeckl. Spikelets much smaller and paler, 3–5-flowered.—Boeckl. acc. to Kükenthal, Fedde, Rep. Spec.

Nov. xxiii. 192 (1926). *E. macra* Kunth, Enum. ii. 142 (1837). *E. debilis*, form (without name) Boeckl. Linnaea, xxxvi. 435 (1869–1870).—BRASIL: Brasilia Merid. prope Yriró, *Sellow*.

I have seen no specimens. Kükenthal cites this form from CUBA, citing *Ekman* 2146, Prov. Oriente, Sierra de Nipe, Rio Piedra.

SPECIES DOUBTFUL OR NOT SEEN[1]

See discussions under *E. intricata* and *E. flaccida*.

E. YUNQUENSIS Britton in Britton & Wilson, Bot. Porto Rico and Virg. Isl. 92 (1923) is closely related to *E. debilis*.

E. PITTIERI Boeckl. Allg. Bot. Zeit. ii. 35 (1896). Based on *Pittier* 548 (specimen seen in herb. U. S.) from Costa Rica. Close to *E. Schaffneri* Boeckl. but apparently a distinct species.

E. LEHMANNIANA Boeckl. Engler, Bot. Jahrb. viii. 205 (1887). Based on *Lehmann* 138 from Ecuador (Spec. seen in herb. U. S.). A distinct Andean species.

I have seen material of these species too late to include them in the present treatment.

GEOGRAPHICAL DISTRIBUTION OF SERIES MACULOSAE

The members of series MACULOSAE, sub-series RIGIDAE are most abundant in the New World, from Texas to Florida and the West Indies, *E. microformis*, *E. praticola*, and *E. bahamensis* being confined to the area, and *E. caribaea* and *E. atropurpurea* likewise occurring in the region. Especially in the West Indies there is difficulty in the precise delineation of species and their nomenclature. *E. caribaea* is distributed in coastal sands, and often in the interior, throughout the tropics and forms a large percentage of the collections of *Eleocharis* from tropical regions. *E. atropurpurea* reaches into the

[1] The following species, superficially resembling *E. capillacea*, belongs to a series (TENUISSIMAE) not specially treated in the present paper.

56. E. **alveolata,** n. sp., dense caespitosa; culmis 2–5 cm. longis, capillaribus, acutis angulatis, a punctis minutis brunneis inspersis, fere recurvatis; vaginis atrosanguineis, firmis, ad apicem paullo inflatis; spiculis linearibus, acutis, 2–3 mm. longis, fere sterilibus; squamis 3–4, elongatis, valde carinatis, brunneis, margine hyalinis; stylo 3-fido; staminibus 3; achaeniis in basi culmorum sitis, acutis trigonis, 1–1.3 mm. longis (cum stylobasi), apice basique angustatis, basi stipitatis, nitido-olivaceis, cancellatis; stylobasi trigona, conica, elongata, nigrescente, ad basin latiore; setis nullis.—Cuba; Brazil. CUBA: vicinity of Colombia, Isle of Pines, *Britton*, *Britton & Wilson* 15621; in pinelands, Herradura, Pinar del Rio, *Ekman* 17788 (TYPE in Gray Herb.; specimen also S); forming vast colonies in pinelands, Mendoza, *Ekman* 18761 (S); in white sand at shore of Laguna Sta. Barbara, *Ekman* 18111 (S); Sierra de Nipe Oriente, *Ekman* 5763 (S); *C. Wright* 3367, in part. BRAZIL: in vicinibus Santarem, Prov. Parà, "Scirpidium (4), September 1850," and "Scirpidium (5), July 1850," *Spruce*.

This species superficially resembles *E. capillacea*, Kunth (with which it has been confused by many writers), differing in the lack of an extensive rhizome, and in the presence of trigonous cancellate achenes. It belongs to an entirely different section, and stands between *E. retroflexa* and *E. Baldwinii*.

temperate regions of Europe and North America, but its occurrence is sporadic.

The sub-series OCREATAE likewise has its center of distribution in the New World. The species are almost entirely confined to the tropics, but one extra-tropical species, *E. olivacea*, extends along the Atlantic coastal plain and spreads out into the glaciated region of eastern North America. Another species, *E. flaccida*, is found in the hot springs at Yellowstone Park. The Brazilian species of this group are not clearly understood. Members are also found in Africa, Madagascar, and Australia.

EXPLANATION OF PLATE 191

(Achenes × 15)

Fig. 39, ELEOCHARIS SCHAFFNERI, Mexico, *Schaffner* 575; 40, E. MACULOSA, Guadaloupe, *Duss* 3911; 41, E. DEBILIS, Brazil, *Mosén* 3510; 42, E. SELLOWIANA, Paraguay, *Ostén* 7882; 43, E. OLIVACEA, Rhode Island, *Olney;* 44, E. EKMANII, Cuba, *Ekman* 19,015; 45, E. MICROFORMIS, Texas, *Buckley;* 46, E. PRATICOLA, Florida, *Fredholm* 5820; 47, E. FLACCIDA, Martinique, *Hahn* 703; 48, E. CARIBAEA, Porto Rico, *Sintenis* 1219; 49, E. ATROPURPUREA, Georgia, *Harper* 1934; 50, E. CAPILLACEA, Brazil, *Sellow;* 51, E. BAHAMENSIS, Bahama, *Small & Carter* 8807..

POGONIA AFFINIS IN THE VICINITY OF WOLFEBORO, NEW HAMPSHIRE.—In 1918 a cluster of three plants in fruit of the rare orchid, *Pogonia affinis* Aust., was discovered in Alton, New Hampshire by F. H. Sargent.

On July 4, 1926 the discoverer extended his station by finding another group of about twenty plants scattered over some fifteen square rods of ground, situated about forty rods from the original station. The plants seemed to prefer the shallow hollows of leaf mould in a broad run in a mixed growth of gray birch and maple, with white pine close by.

In June of the present year, Miss Hazel Cotton, one of my pupils in botany, discovered a second station in Brookfield, New Hampshire, perhaps ten miles from the Alton station. This station is also double, containing five plants at one place and about ten plants at another place thirty-five or forty rods away. Nearly all these plants produced flowers, about half of them having two flowers. They were a week earlier than the Alton plants this year, where but eight plants could be found, only one of which was in flower.

The Brookfield station is similar to the Alton one so far as the woodland growth is concerned, but the shallow hollows were not so marked.

At both places an abundance of *Cornus Canadensis, Trientalis, Medeola*, and several species of ferns makes it difficult to see the *Pogonia*. Its most noticeable characteristic is a greenish white bloom on the thick stem and leaves.

Specimens from Brookfield and Alton have been deposited in the herbarium of Brewster Free Academy, and in the Gray Herbarium.—H. E. SARGENT, Brewster Free Academy, Wolfeboro, New Hampshire.

UNUSUAL WEEDS IN MILTON, MASSACHUSETTS.—Last summer I saw an unfamiliar *Amaranthus* in my garden. Two plants were pressed, or that was the intention. It turns out that one is *A. hybridus* L., common enough. The other is *A. Palmeri* Wats., noted in RHODORA (1915) from Malden and South Lawrence. This very nearly passed as *A. spinosus* L., as its "pungent bracts" would readily pass for spines.

A single plant of *Erysimum repandum* L., noted in RHODORA (1916) from Dorchester in 1885, was found, also in my garden. Happily, it was large enough to share with the herbarium of the New England Botanical Club.

A small colony of *Erodium Botrys* Bertol., noted in RHODORA (1919), p. 70, persisted this year in a quiet corner. A specimen has been placed in the Club herbarium.

Centaurea melitensis L., noted in RHODORA (1924) from South Boston, *C. E. Perkins*, 1880, appeared in one of my flower-beds—a single plant, but shared with the Club.

My thanks are due Prof. Fernald for aid with these.

Another interesting weed, a lone specimen, has flowered in my garden. During its early stages this summer I thought it was *Salsola Kali* L., var. *tenuifolia* G. F. W. Meyer. When flowers appeared it proved to be a composite, *Schkuhria Wrightii* Gray. Dr. S. F. Blake aided in its identification, and Mr. Weatherby adds: "A species of New Mexico, Arizona, and adjacent Mexico. So far as I can find from a somewhat hurried search, this is the first record for New England and northeastern North America in general."—NATHANIEL T. KIDDER, Milton, Massachusetts.

A NEW COLOR FORM OF A WILD STRAWBERRY.—On May 11, 1929, while on the way to the Waukegan Moorlands, I stopped to look for

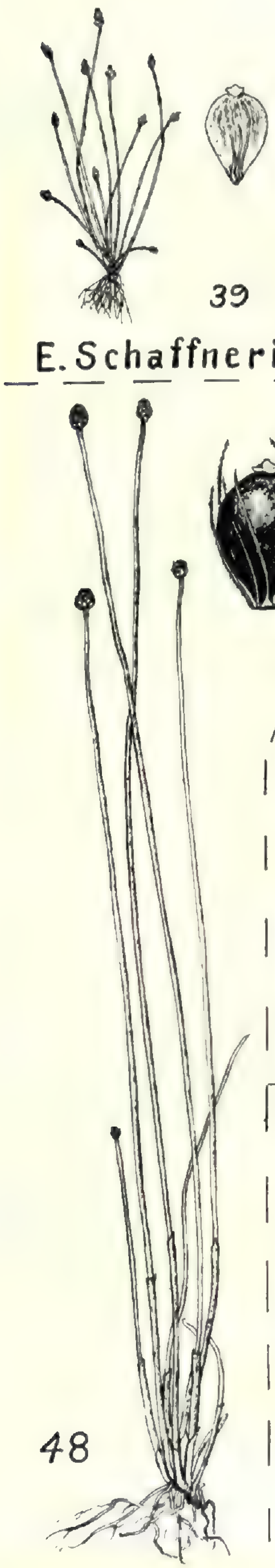
violet plants in an oak grove just south of the sidewalk at the city limits of Waukegan. I noticed that the flowers of the strawberry plants in this locality had an unusual pink tinge, and upon closer investigation found that all plants in this spot were alike in their coloring. The new buds were a deep pink, and as they opened they became paler, with a color similar to that of apple blossoms. On the inside the petals were white, but outside from tip to base there was a pink stripe which faded into the white.

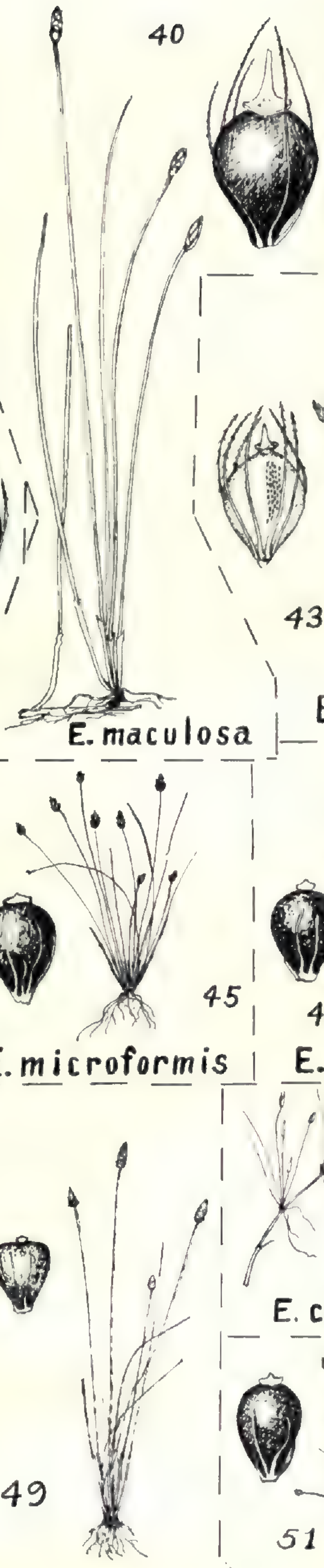
I had two of these plants for a couple of days before pressing and even when the petals dropped they still retained the pink coloring. The new leaves also seemed to have a rosier color than those of the average plant.

One of these specimens in is the herbarium of the Field Museum. Since, apparently, there has been no record of such a variety, it has been suggested that it be given a formal name. It may be called

FRAGARIA VIRGINIANA L.f., forma **maliflora**, f. nov. A forma typica differt petalis extus in alabastro roseis, apertis linea rosea longitrorsum pictis.—ILLINOIS: Waukegan, in rich wet soil in wooded place, May 11, 1929, *Nellie V. Haynie 1492.* (Herb. Field Mus. No. 588638, TYPE).—NELLIE V. HAYNIE, Oak Park, Illinois.

Vol. 31, no. 370, including pages 193 to 220 and plate 190, was issued 23 October, 1929.





H. K. Svenson del.

ELEOCHARIS, SERIES MACULOSAE

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Vol. 31. December, 1929. No. 372.

JOHN ROBINSON, BOTANIST, OF SALEM, MASSACHUSETTS

ALBERT P. MORSE

(With portrait)[1]

IT was with a distinct shock that I learned, when appealed to from Washington for information, that no sketch of John Robinson's botanical work—nor, indeed, a biography of any sort—had ever appeared in any scientific journal, not even mention of his death. This unfortunate oversight was probably but the natural consequence of his having outlived most of his contemporary workers and the fact that for thirty years previous to his death his activities had been confined almost exclusively to other channels.

It seems wise, therefore, even at this late date, to publish an outline of the work of a New England botanist prominent locally in the '80's of the last century, together with as complete a list as practicable of his botanical writings.

This brief sketch of what might be termed his botanical biography is based on the account printed in the daily press at the time of his death,[2] on notes imparted to me from time to time by its subject and his acquaintances, and upon an autobiographical sketch which he prepared for his family, for access to which I am greatly indebted to them and from which I have freely quoted.

John Robinson, Keeper of the Marine Room of the Peabody Museum of Salem, Massachusetts, died suddenly of heart failure at his home in Salem, April 9, 1925, in his 79th year.

[1] From photograph in Peabody Museum, dating from about the time of his greatest botanieal activity.

[2] Salem Evening News, April 10, 1925.

He was born in Salem, July 13th, 1846, the son of John and Lucy Pickering (Stone) Robinson. His father had died several months previously, leaving his mother in comfortable circumstances. At the time of his birth he was an only child and being of somewhat delicate physique his childhood was of sheltered character.

Nominally, he was educated in private elementary and the public grammar and high schools of Salem, supplemented, after withdrawal from the high school owing to its unsettled condition due to the war, by additional private lessons and by courses in botany at Harvard College. But as he himself said, "his education lacked system and did not actively begin until he had left schools behind."

He had no inclination toward college, and no effort was made to arouse an interest in a college career, nor authority exercised to force him to attend. This lack of a college training and associations he regretted, feeling that he had missed an experience that would have enriched his life, equipped him better for his work, and supplied something of which he felt the lack when too late to secure it.

While not compelled to work, when nineteen years old he became a clerk in the commission house of Alden Speare, Boston, dealing in oils, candles, and starch. Here he became acquainted with the business methods of the day, learned to meet all sorts of people, practiced his arithmetic and geography, and found it a far better school than any he had ever attended. He remained in this position for several years, practically until he became connected with the Peabody Museum (at that time named the Peabody Academy of Science), with which the rest of his life was bound up to a degree impossible to realize except by those directly associated with him in his later years.

As a boy he "best liked dabbling in natural science and history"; and these pursuits later became the dominant ones. At an early age he fell under the influence of Dr. Henry Wheatland of Salem, "whose main object in life was the development of the Essex Institute"; joined the Institute at the age of fifteen, and when seventeen years old was appointed curator of the relics of the Civil War and later of the entire historical department. "It was Dr. Wheatland's influence, his truthfulness and constant encouragement which gave Robinson his start in natural science and local history and maintained his interest in museum work. To make a boy of seventeen a curator in a department of a recognized public institution and to trust him

with the entire responsibility of the collections in that department, was more binding than chains and safer than locks to keep him at his job; it engendered pride in the trust shown in him, it created the spirit which lasted and went with him in all his institutional work through life."

In childhood he had learned the names of all the flowers in the gardens about. During the train rides to and from Boston while clerking it he read Gray's Lessons in Botany, Dana's Geology, and kindred books. On Sundays he took botanical rambles in the nearby country, and in the summer vacation visited the White Mountains, where he discovered at the Crystal Cascade in 1865 a fern (*Aspidium fragrans*) not then reported from New England. His interest in plants led him to make inquiries regarding certain ones at Harvard College and the Botanic Garden, thereby becoming acquainted with the botanists there, of whom Professor Asa Gray was the leading spirit, with the result that he took the last summer course in botany given by Professor Gray, the first by his successor, Professor George L. Goodale, and a winter course in cryptogamic botany at the Bussey Institution under Dr. W. G. Farlow, attending also his lectures on the subject in the regular college course.

"In 1874 he took charge of the herbarium of the Peabody Museum" (which had been received from the Essex Institute at the time of its founding), the arrangement of which had been left unfinished by Cyrus M. Tracy of Lynn. "This work on the plants of the County inspired a desire to improve and so far as possible complete the collection and publish a catalog of the County flora. After six years of preparatory work the catalog was printed in 1880 and contained, besides, many notes and locality descriptions. It was the first catalog of its character of any local flora, nearly all previously issued being hardly more than lists of plants." In the preparation of this work Robinson was greatly aided by local botanists and specialists (e. g., Chas. J. Sprague,—lichens; F. S. Collins,—marine algae), and had the personal assistance of Caleb Cooke, John H. Sears, and W. P. Conant in collecting and determining specimens. (See acknowledgments in the Flora, pp. 25, 26, 115, 137, 146, 149, 157.) It included not only the phanerogams and vascular cryptogams but also the mosses, stoneworts, lichens and marine algae. It enumerated 673 genera, 1694 species, and 140 varieties from the County.

During its preparation Robinson published papers on the ferns of Essex County, a list of North American ferns, and a volume on the cultivation of ferns entitled "Ferns in Their Homes and Ours" which met with a warm reception and ran through several editions.

Robinson contributed to the collections of the Peabody Museum over 1000 sheets of Essex County plants and nearly as many of ferns and lycopods from all parts of the world, besides numerous miscellaneous lots from various collectors. He gathered an extremely interesting and complete series of specimens to illustrate the County woods and woody plants, nuts, etc., and prepared a paper on the woody plants of Essex County which came to the attention of Professor Charles S. Sargent of the Arnold Arboretum, thereby leading to a valued and lifelong friendship. In fact, Professor Sargent induced Robinson to accept a position as assistant in the Arboretum in charge of the herbarium, a position which he filled for two years and a half.

Robinson was also interested and active in the Massachusetts Horticultural Society and served as the honorary "Professor of Botany" of that organization for several years. With Sargent's assistance he prepared two papers on arboriculture which he read before the Horticultural Society and the State Board of Agriculture.

In June, 1875, Robinson was chosen a trustee of the Peabody Academy of Science and in October was made its treasurer and given practical charge of the museum, Dr. A. S. Packard being the scientific director. On the opening of the Summer School of Biology of the Academy at Salem by Dr. Packard, in 1876, Robinson conducted the botanical courses, and again in 1877. This led to his delivering botanical lectures before various schools and clubs in the vicinity of Salem and forming a botanical class at the Museum, which he conducted for several years.

It was during this period of botanical activity that he met (1870) Charles Faxon and began a lifelong friendship with him and other members of his family, a friendship which lasted till the death of Faxon in 1919. Faxon's scientific work and attainments ever called forth the sincere admiration of Robinson. Another of his intimates at this time was the Rev. E. C. Bolles of Salem, later of New York and of Tufts College, with whom he botanized, who aided him with criticism and advice while preparing his fern book, and aroused his interest in micro-botany.

Relative to his personal predilections in the botanical field, Robinson writes, in the third person:—"He never found a plant new to botanical literature[1] nor rearranged the specific or generic limits of those already known. His interest in botany was in outdoor observations, and he detested 'closet-work.'[2] Physiological botany and morphology, not the dry descriptive indoor work, was what he enjoyed. He had a supreme contempt for the continual disarrangement and rearrangement of names; and the confusion that the nomenclaturists seemingly gloated over in pages of discussions over 'rights of priority' by which established names were thrown aside for forgotten ones,—this thoroughly disgusted him. The study of the structure and development of plants seemed more worth while and the plants themselves in the field more interesting through microscopic studies, so much so that, later, he cared little to collect them for herbarium preservation."

From the time of Robinson's election as treasurer of the Museum in 1875 he had exercised more or less control over its affairs, and when Dr. Packard resigned in 1878 he was appointed director *pro tempore*. Professor Edward S. Morse was elected director in 1880 and while he was absent in Japan and during his lecture tours and leaves of absence in later years, Robinson officiated as acting-director, the duties of which position he discharged for many years, practically until the present assistant-director, Mr. L. W. Jenkins, was placed in charge in 1914.

During this time his attention and labors were of necessity distributed over various fields, from botany and general natural history to ethnology and archaeology, as required by the needs of the moment. At the outset of this period his old mentor, Dr. Wheatland, had said that "to do justice to the museum as a whole he must give up the idea of specializing in any department; that a museum usually reflected the interest of the curator, and that there was always a danger that the dominance of this interest would be to the injury of the balance of the institution," a truth which Robinson soon found out; and he says: "No better advice . . . can be offered to a

[1] Robinson should be credited, however, with the colloquial name "Christmas Fern" applied to *Polystichum acrostichoides;* and for the varietal name "*Phippenii*" proposed for the salmon-colored form of *Aquilegia canadensis.* (Flora E. Co., p. 30).

[2] An excellent example of the sort of work that attracted him is the series of letters contributed to the Salem Gazette and later published by the Essex Institute under the title of "Our Trees." Another, which his modesty led him to think not worth publishing, is the article on "Plants growing the first season in an uncovered cellar." Rhodora, vol. 28 (1926), p. 69–74.

museum housekeeper. More museums are wrecked by a too eminent scientist at their head than by curators who hold no seats in the temples of the savants."

Toward the end of the century historical marine material began to accumulate and as it did Robinson took charge of it and developed the Marine Room with customary efficiency and success. This work occupied the major part of his time and interest until his death. The dedication of the new marine hall to be opened shortly as John Robinson Hall will be but a suitable testimonial to his activity in this field.

Robinson collected coins and curiosities as a child and had a cabinet of such when but eight years old. This interest never left him but in later years was confined to the coinage of the Far East. At the same time he amassed a good library on the subject and in 1913 gave both coins and books (about 3400 coins and 500 books and papers) to the Essex Institute as a memorial of his father and mother, publishing privately at the time a catalog of the library.

Feeling the need of a good historical guide-book for Salem, he compiled,—with Thomas Franklin Hunt, then in charge of the Essex Institute,—the "Visitor's Guide to Salem," first published by the Institute in 1892, which has had a large sale, amounting to nearly 60,000 copies. To this, in its various editions, Robinson alone contributed the sections on the Peabody Museum and the biographical sketch of Hawthorne in Salem.

A man of his versatility and attainments was naturally called upon to serve the community in various ways. He was a member at various times of the common council, the school board, the sewer commission, the board of health of Salem; trustee of the Salem Hospital, Public Library, Ropes Memorial, Bertram Home for Aged Men, East India Marine Society, and Salem Athenaeum. He belonged to the Sons of the American Revolution, Society for the Preservation of New England Antiquities, American Museums Association, Essex Institute, several numismatic clubs, and many other organizations of similar character.

As a person versed in horticulture, it was inevitable that his advice should be sought relative to the laying out of gardens, and he gave freely of his time and interest in that direction. He planned those of the Salem Club in 1895 and of the Ropes Memorial in 1912. In fact, it is not too much to say that to his botanical and historical

knowledge, good taste, practical sense, and warm interest the Ropes Memorial owes what it is today. His own garden, at his home in Salem, was a most attractive spot in which to work, play, or dream, and he had labored in it on the day of his death.

Mr. Robinson married, in 1869, Miss Elizabeth Robbins Kemble of Wenham, who survives him, as do also a son, John Robinson, Jr., two daughters, Mrs. Richard Wheatland and Mrs. John Bertram Ropes of Salem, and eight grandchildren.

To those who never had the good fortune to meet Mr. Robinson, to experience his genial courtesy, rare tact and charm of manner, intuitive perception and appreciation of altruistic motives, it may be said that these characteristic qualities and his whole-hearted devotion to the work which came to him to do, were an inspiration. And by those who were associated with him the memory of his friendship will ever be treasured among the finer things that life has brought.

Botanical Bibliography of John Robinson.

(Drawn from a more complete bibliography to be published elsewhere.)

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1923d. [Disappearance of Trees in Salem listed in "Our Trees."] Salem News, Aug. 1, 1923 (Man About Town).
1924c. [Catalpa Trees in Salem.] Salem News, July 22, 1924 (Man About Town).
1926. Plants growing the first season in an uncovered cellar (from mss. prepared in 1908). Rhodora, vol. 28, 1926, p. 69–74.

Peabody Museum,
Salem, Massachusetts.

Propagation by Seed in Hydrangea.—Apropos the writer's note on *Hydrangea paniculata*, Sieb. as naturalized in Massachusetts,[1] Dr. Theo. Holm has recently suggested,[2] that propagation by root-shoots (stolons) is more likely than by seed.

When the Lincoln station was first discovered last year, a superficial and unsuccessful search was made for unmistakable seedlings. Early in the following December, some seed was collected from open capsules still persisting on the frost-bitten panicles. Through the courtesy of Mr. Alfred Rehder, a germination test of this seed was made at the Arnold Arboretum. It proved to be normally viable.

[1] Rhodora, xxxi, 18, 1929.
[2] Ibid, xxxi, 120, 1929.

This autumn, a more thorough search at the Lincoln station yielded several small plants, apparently seedlings, ranging from 1–3 dm. high. These were carefully lifted and examined for possible evidence of stoloniferous origin, without success. No "runners" or "root-shoots" were discernable. In one instance, a small seedling bore a prostrate branch of second year growth, which had rooted freely at the nodes. This was an instance, doubtless, of natural "layering," which suggests an alternative method of reproduction, although nothing of the sort was found to occur on the mature shrubs. Representative specimens of these seedlings have been deposited in the Gray Herbarium.

Although the writer would not presume to assert that propagation by stolons does not occur in this species, he has been unable to find any evidence to this effect in the plants under his observation.—R. J. Eaton, Cambridge, Massachusetts.

Note on Trisetum spicatum.—In a short article on *Aira spicata* L., Mr. K. K. Mackenzie[1] states that *Aira spicata* (*Trisetum spicatum*) is invalidated by *A. spicata* published on the preceding page. One fact should be added to Mr. Mackenzie's statement. In the "Errata" at the end of the second volume of the Species Plantarum Linnaeus changes *Aira* 1. *spicatum* to *indicum*. The first volume of the Species Plantarum was published in May, the second in August.[2] According to the American Code (Canon 13) the second *Aira spicata* (*Trisetum*) is a homonym and hence invalid. Some botanists may accept Linnaeus' own correction as if originally the first *A. spicata* read *A. indica*, in which case the second *A. spicata* is valid. Under the the International Rules (Article 50) the second *Aira spicata* (*Trisetum spicatum*) is valid because the first *A. spicata* is universally regarded as non-valid. Furthermore priority of position for names published on the same date is not recognized by the International Rules and Linnaeus' correction, even though at a later date, would validate the second *A. spicata*.—A. S. Hitchcock, Washington, D. C.

[1] Rhodora 31: 194. 1929.

[2] Richter, Codex Bot. Linn. xxx. 1835; Jackson, Journ. Bot. Brit. & For. 61: 174. 1923.

SOME LOCAL PLANTS OF VIRGINIA

F. W. Hunnewell

The Shenandoah Valley today is too well cultivated and given up to farms and orchards to make it especially inviting ground for a botanist. But occasionally there are places where the underlying limestone comes to the surface making the ground too rough and rocky for the farmer. This is so where Cedar Creek crosses the main highway, the Valley "Pike," about thirteen miles south of Winchester in Frederick County, the northwesternmost county in Virginia.

On the north bank of this creek are a series of low rocky, wooded hills, in places with almost precipitous cliffs of limestone rising one hundred feet above the edge of the stream. Here on October 19, 1864 was fought the Battle of Cedar Creek, these hills having been fortified by the Union army and still plainly showing the old line of trenches.

In the early spring the banks of the creek present a beautiful sight with trilliums, *Mertensia virginica* and *Delphinium tricorne*, while higher up the hillsides are covered with *Cercis canadensis* and *Cornus florida*. It is along the dry rocky tops of these hills that I have found some plants which I think may be worth recording.

In several places growing beneath the pines, and giving much the same effect as *Arctostaphylos Uva-ursi* in our New England woods are large patches of *Pachystima Canbyi* Gray. How common this is in Virginia I do not know. In Gray's Manual its range is given as "Mts. of s. Va. and W. Va." and the only specimens in the Gray Herbarium are from Wythe and Giles counties in the southern part of the state and about 170 miles to the southwest. Scattered through these woods is also growing *Parthenium auriculatum* Britton, described by him in the first edition of his "Illustrated Flora" as from the "Mts. of Virginia." In general appearance it is quite distinct from *P. integrifolium* L. and resembles more closely *P. repens* Eggert of Missouri and Kansas, but differs from the latter in having a thick tuberous root.

A third plant is *Astragalus distortus* T. & G. which I believe has not been recorded before from Virginia. This is a plant of the Mississippi valley, west to Texas, the only other recorded station in the East being Moorefield in Hardy County, West Virginia, the adjoining county on the other side of the mountains. A thorough

search revealed only a few plants, all growing in dry sunny places among the limestone rocks.

"Belle Grove," Meadow Mills, Virginia.

Vol. 31, no. 371, including pages 221 to 244 and plate 191, was issued 4 November, 1929.

ERRATA

Cover-page 1, no. 361, for **Editoral**, read **Editorial**
Page 14, line 28, for *Medeala*, read *Medeola*
" 32, " 31, *for* 10.7, *read* 1.07
" 37, " 9, for **brevifolia** read **brevifolium**
" 39, " 25, *for* simple, *read* ample
" 43, " 19, *for* sepcimens, *read* specimens
" 47, " 42, *for* borowed, *read* borrowed
" 48, " 27, for NERVATA, read STRIATA
" 53, " 4, for **albiligulata**, read **albiligulatus**
" 53, " 13, for CANADENSE, read CANADENSIS
" 55, " 6, for *Cypripediums*, *read* cypripediums
" 95, " 29, *for* Lyonia, read *Lyonia*
" 109, " 5, *for* Hitchcock & Chase, *read* Hitchcock
" 141, " 7, of foot-note, for *virginiana*, read *virginica*
" 142, " 17, for *triolius*, read *trifolius*
" 172, " 6, of foot-note, for *pauciflorus*, read *pauciflora*
" 174, " 3, for *paucifloras*, read *pauciflora*
" 174, " 8, for *pauciflorus*, read *pauciflora*
" 203, " 22, *for* Copiepo, *read* Copiapo
" 216, " 10, *before* should, *insert* I
" 235, " 9, *for* Kukenthal, read Kükenthal
" 237, " 7, for *ocreatus*, read *ocreata*
" 237, " 8, *for* Neeis n, *read* Nees in
" 238, " 10, for *ocreata*, read *ocreatus*

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